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ABSTRACT

This report summarizes characteristics of students with disabilities in the National Education Longitudinal Study (NELS:88), which conducted a base-year survey in 1988 of all U.S. public and private schools containing eighth grades, followed up at 2-year intervals in 1990, 1992, and 1994. Among general observations are the following: (1) students identified in NELS:88 as disabled tended to have greater difficulties in school and realized fewer positive outcomes of schooling; (2) relatively small percentages of students with disabilities as identified by NELS:88 perceived themselves or were identified by school officials as having received special education services during high school; and (3) teachers in NELS:88 were perceptive judges of which students were failing to perform well in the classroom, but linking the identification of disability status to classroom performance may blur the distinction between students with disabilities and students at risk. After an introductory chapter, individual chapters address the following issues concerning students with disabilities: disability identification, students' background characteristics, school experiences, and educational outcomes. A concluding chapter lists characteristics of populations identified as disabled by both parents and teachers and only by teachers, not by parents. Four appendices list NELS:88 indicators of disability, NELS:88 disability estimates based on alternative disability definitions, and research/technical notes. (Contains 12 references.) (DB)

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Statistical Analysis Report **June 1997**

National Education Longitudinal Study of 1988

Profiles of Students with Disabilities as Identified in NELS:88

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National Education Longitudinal Study of 1988

Profiles of Students with Disabilities as Identified in NELS:88

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U.S. Department of Education
Office of Educational Research and Improvement **NCES 97-254**

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Highlights

About NELS:88

- The National Education Longitudinal Study of 1988 (NELS:88), conducted by the National Center for Education Statistics (NCES), began with a base-year survey of 8th-grade students in 1988, followed up at 2-year intervals in 1990, 1992, and 1994. Because of its broad scope and longitudinal design, NELS:88 provides an important source of data by which to examine the status and experiences of students as they progress from middle school through the high school years.

- The NELS:88 base-year sample consisted of all U.S. public and private schools containing eighth grades. Excluded from this sample, however, were special education schools, ungraded classrooms, and students determined by local staff to be incapable of participation in the survey for reasons of language or of mental or physical disability. As a result, as many as one-half of the children with disabilities who are served under the Individuals with Disabilities Education Act (IDEA) were likely excluded from the NELS:88 base-year sample. Further information about how the counts of students with disabilities in the NELS sample compare to counts of students with disabilities under the IDEA and in national longitudinal studies can be found in Appendix A (see also OSEP 1994; Wagner et al. 1993).

- The primary purposes of this report are to identify those students in NELS:88 who had or may have had a disabling condition or received services related to such a condition, and to examine their characteristics and their educational experiences and outcomes, as they progressed from the eighth grade in 1988 into and out of high school in 1992. Another purpose is to examine the alternative perceptions of disability status that are available from the four different respondent groups in NELS:88 (parents, teachers, students, and school officials) and to assess the extent to which these various perceptions affect descriptions of the characteristics, experiences, and outcomes of students with disabilities.

Using NELS:88 to Define Disability Status

- NELS:88 provides four different sources of information related to disability status—parents, teachers, students, and school officials. Each of these sources responded to different items relating to students' disability status. For example, teacher perceptions of students' disability status was linked to students' classroom performance, whereas parental identification was linked to whether or not a student had ever received disability-related services. As a result, all of these data sources produce different estimates of the disabled population of students in grades 8-12.

- The degree of overlap among students who identify themselves or are identified by parents, teachers, or school officials as disabled is often quite low—that is, the populations of students identified as disabled by these different sources appear to be somewhat separate and distinct groups of students. Nonetheless, the patterns of difference between the various disabled and nondisabled student groups that can be identified using NELS:88 data appear rather similar to one another in many respects.

Background Characteristics of Students with Disabilities

- Students identified by teachers or parents as disabled in NELS:88 were more often male, had lower scores on locus of control psychological measures, and were slightly older than students not so identified. Students identified as disabled by teachers were more likely to come from households headed by single females, to have lower individual socioeconomic status (SES) and lower self-esteem, and to have parents with lower levels of education than nondisabled students.

- Similar percentages of parent-identified disabled students and students in the nondisabled population were members of minority groups (23.7 and 26.9 percent, respectively). Among students identified as learning disabled by parents and teachers, teacher-identified students were more likely to be black than were parent-identified students (16.6 percent versus 7.9 percent, respectively). Black students were actually underrepresented among those students classified by parents as learning disabled.

- Students who identified themselves as disabled were more likely than their nondisabled counterparts to be male (60.8 percent versus 49.7 percent). Self-identified disabled students also scored lower on locus of control psychological measures than did nondisabled students. However, students who identified themselves as disabled were proportionally represented in terms of race and had similar SES status as those students who did not identify themselves as disabled.

The School Experiences of Students with Disabilities

- Compared to students not identified as disabled in NELS:88, students identified by teachers and parents as disabled took more remedial mathematics and English courses, had earned fewer units in core curriculum areas, had more often repeated a grade prior to the eighth grade, and were more likely to have participated in dropout prevention programs. However, these students evidenced relatively low levels of participation in "special education programs for the educationally or physically handicapped" (between 2.0 and 11.2 percent). In addition, students identified by teachers as disabled participated in extracurricular activities to a lesser extent than nondisabled students.

- Students who identified themselves as disabled reported higher levels of participation in remedial English and mathematics programs than did their nondisabled counterparts (32.1 percent versus 18.7 percent and 42.9 percent versus 20.3 percent, respectively). These students also reported that they and their parents participated in school-related activities as frequently as parent-identified disabled students.

Educational Outcomes of Students with Disabilities

- Students identified by teachers and parents as disabled in NELS:88 earned lower high school grades in core courses, scored lower on mathematics and reading proficiency tests, and were more likely to drop out of school than their nondisabled counterparts. In addition, these students reported lower educational expectations, for themselves and for them by their parents, and were less prepared for higher education than their nondisabled counterparts by virtue of not having taken the ACT or the SAT.

- Among the different disability categories, students identified by their parents as having emotional problems recorded the lowest grades and the highest levels of school dropout. Teacher- and parent-identified students with multiple disabilities and learning disabilities recorded the lowest mathematics and reading proficiency levels.

- Self-identified students with disabilities reported comparable grades to nondisabled students with the exception of English, but reported higher dropout rates and lower mathematics and reading proficiency levels.

General Observations

- *Students identified in NELS:88 as disabled tended to have greater difficulties in school and realized fewer of the positive outcomes of schooling.* These students were more often retained in grade, enrolled in remedial classes, and placed in dropout prevention programs. Perhaps as a result, they earned fewer credits in core curriculum areas, had lower educational expectations, and had higher dropout rates than nondisabled students on average. The severity of these sorts of education-related problems for disabled students did appear to vary by type of disabling condition. For example, students with emotional problems were shown to have among the highest dropout rates, while students with health problems compared most favorably with nondisabled students with respect to several types of outcomes. For these reasons, when the school experiences and outcomes of disabled students are examined, it continues to be important to collect information and carry out analyses separately for various specific disability categories.

- *Relatively small percentages of students with disabilities as identified in NELS:88 perceived themselves or were identified by school officials as having received special education services during high school.* The low reported participation rates in "programs for the educationally or physically handicapped" and in special education programs may raise questions concerning the adequacy with which students with special needs are identified and served in our nation's high schools, and the extent to which these students are being served in more inclusive environments that might affect their awareness of being in a "special" program. It should be noted, however, that not all children with disabilities need special school services; for example, a child with a purely physical disability who receives the proper medical services for that disability may not require special services. In addition, NELS:88 sampling procedures and instrumentation effectively may have removed from consideration many students who would typically receive services under the Individuals with Disabilities Education Act (IDEA) and may have led to the identification of students at risk of educational failure generally as disabled students.

- *Teachers in NELS:88 were perceptive judges of which students were failing to perform well in the classroom, but linking the identification of disability status to classroom performance may blur the distinction between students with disabilities and students at risk.* In NELS:88, teachers identified students as disabled only if their condition affected their school work. As a result, students whose disabilities did not affect their work would likely not have been classified by teachers as disabled, and students whose disability status might have been questionable but whose work in school was poor may have been classified by teachers as disabled. Despite this vagueness in disability definitions, teacher reports of student disability status often "overlapped" the reports made by different NELS:88 respondents. And, the students identified by teachers as disabled (in contrast to those identified by parents) also were found to have more of the sorts of personal characteristics, educational experiences, and records of achievement one might associate with students in need of special services (e.g., lower SES, higher participation in dropout prevention programs, lower gains in reading proficiency). In the future, however, it will be important for survey research efforts to separate perceptions of student disability status from their classroom performance.

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Chapter 1
Introduction

Since the passage of the Education for All Handicapped Children Act of 1975, now called the Individuals with Disabilities Education Act (IDEA),[1] providing special programs and services for students with disabilities has become a major component of the nation's overall education enterprise. As a result, education practitioners, researchers, and policymakers at all levels have been keenly interested in better understanding the characteristics, educational experiences, and outcomes of students with disabilities. These practitioners have also been interested in better assessing the degree to which the spirit and mandates of the IDEA are being carried out by state and local education agencies to meet the needs of this specially challenged population of youth. Of particular interest is the quality of the educational experiences of these students in the context of their transition from school to work or to postsecondary education.

A decade ago, the National Center for Education Statistics (NCES) of the U.S. Department of Education published a report entitled *Characteristics of High School Students Who Identify Themselves as Handicapped* (Owings and Stocking 1985), based on data from the High School and Beyond (HS&B) surveys of high school sophomores and seniors in 1980 and 1982. This report provided the basis for examining the status and experiences of secondary students with disabilities at the national level and for meeting the information needs described above. With the development of the National Education Longitudinal Study of 1988 (NELS:88), the means are available to update and expand upon this earlier report with nationally representative, longitudinal data on students in grades 8 through 12.

The National Education Longitudinal Study of 1988

In accordance with its congressional mandate to collect and disseminate statistics and statistical analyses, and in response to the need for policy-relevant, longitudinal data on nationally representative samples of elementary and secondary students, NCES initiated a continuing, long-term program called the National Education Longitudinal Studies (NELS). The goal of this program is "to study the educational, vocational, and personal development of

[1] P.L. 94-142 was initially enacted as the Education for all Handicapped Children Act of 1975, and succeeded earlier federal legislation to provide grants to states to support the education of children with disabilities. P.L. 94-142 has undergone a series of amendments, including P.L. 101-476, the Education of the Handicapped Amendments of 1990, which renamed the earlier legislation the Individuals with Disabilities Education Act (IDEA) and, among other things, substituted the term "disabilities" for "handicapped" throughout the Act.

students at various grade levels, and the personal, familial, social, institutional, and cultural factors that may affect that development" (NCES 1994). NELS:88 represents the third major study in the NELS program, and follows the National Longitudinal Study of the High School Class of 1972 (NLS-72) and the High School and Beyond (HS&B) study of 1980.

NELS:88 began with a base-year survey of eighth-grade students in 1988, followed up at 2-year intervals in 1990, 1992, and 1994.[2] NELS:88 collected data from more than 20,000 students, as well as their parents, teachers, school principals, and high school transcripts. The study entails a complex sampling design, which includes such features as augmentation (through "freshening") to provide a representative sample of students at each phase of the survey (i.e., to represent the tenth-grade population in 1990 and the twelfth-grade population in 1992); the follow-up and subsequent inclusion of students who were not eligible to participate during the base year (base-year-ineligible, or BYI students) or who dropped out of school; and a complex set of case weights that support longitudinal analyses and combinations of data from student, parent, and teacher surveys.

The target population for the NELS:88 base-year survey consisted of all public and private schools containing eighth grades in the 50 states and the District of Columbia. Excluded from the NELS:88 sample were Bureau of Indian Affairs (BIA) schools, special education schools for the disabled, area vocational schools that did not enroll students directly, and schools for dependents of U.S. personnel overseas. Within eligible schools, ungraded classrooms were not included in the NELS:88 sample.

The population of sampled eighth-grade students excluded students with severe mental disabilities, students whose command of the English language was not sufficient for understanding the survey materials (especially the cognitive tests), and students with physical or emotional problems that would have made it unduly difficult for them to have participated in the survey. Eligibility decisions for students were made on an individual basis by school staff; school coordinators were told that when there was doubt, they should consider the student capable of participating in the survey.

By these procedures, a total of 5.35 percent of the potential student sample was excluded for reasons of mental disability (3.04 percent), limited English proficiency (1.90 percent), and physical or emotional problem (0.41 percent). Students thus excluded from base-year participation were followed and many were included in subsequent follow-up surveys.

As a result of the exclusions discussed above, as many as one-half of the children with disabilities who are served under the IDEA were likely excluded from the NELS:88 base-year sample. For this reason, the NELS:88 data should not be considered representative of children with disabilities as identified under the IDEA. At the same time, the NELS:88 data set does allow for comprehensive examination of students perceived by parents, teachers, school officials, and by students themselves as having disabilities and the roles that school and home environments play in promoting their growth and achievement of positive (or negative) outcomes.

[2] A fourth follow-up is tentatively scheduled for 1998.

Purposes of This Report

The primary purposes of this report are (1) to identify those students in NELS:88 who had or may have had a disabling condition or received services related to such a condition and (2) to examine their personal and family characteristics and their educational experiences and outcomes as they progress from the eighth grade in 1988 into and out of high school in 1992. Several data sources available in NELS:88 are used to identify and describe these students in this report. In particular, parent surveys in the base year (1988), teacher surveys in the first follow-up (1990), student surveys in the first and second (1992) follow-ups, and information related to special education participation collected from high school officials for inclusion in the high school transcript file are used to *identify* students with disabilities. In addition, select data from the base-year and first and second follow-up surveys are used to describe the populations of students identified as disabled by these various sources. A third purpose of this report is to examine the alternative definitions of disability that are available from these diverse data sources in NELS:88 and to assess the extent to which these various definitions influence descriptions of the characteristics, educational experiences, and outcomes of students with disabilities.

This report is one of a series of NCES reports analyzing NELS:88 data in order to address key policy issues and fundamental questions related to the development of our nation's youth and their educational infrastructure. This particular report—on the profiles of youth with disabilities as identified in NELS:88—is designed to provide useful information to federal, state, and local policymakers and agency program staff, and to education researchers, practitioners, and advocacy groups concerned about improving services for students with disabilities. Collectively, these audiences will be interested in deriving meaningful estimates of the numbers of students with specific disabilities, discerning trends over time related to this population, and describing the education-related experiences of students with disabilities and the effects of these experiences on students' educational performance and expectations.

Organization of This Report

The remainder of this report is organized around key topics and related research questions that must be addressed to achieve the objectives described above. In the discussion of a particular topic (e.g., demographic characteristics), comparisons are made between populations of students with and without disabilities as a whole, focusing on two primary sources of information regarding disability status—parents and teachers of the students surveyed in NELS:88. These sources permit further comparisons to be made between students identified as having specific types of disabilities (e.g., learning disability, physical disability, sensory disability) and those students not identified as disabled. Supplementing the data based on parent and teacher reports are selected comparisons based on student self-definitions of disability status. Each chapter is described briefly below.

Chapter 2. Identifying Students with Disabilities addresses questions such as the following: *How is the disability status of children and youth determined in NELS:88 and other major national surveys, such as HS&B? Which of the alternative definitions of disability status available in NELS:88 provides useful bases from which to examine educational experiences and outcomes? To what extent are there overlaps among these various disability definitions?* To address these questions, chapter 2 outlines various ways students with disabilities have been identified and classified for eligibility

in federal programs and data collection activities; reviews the indicators in NELS:88 related to disability status and disability-related services received, providing rationales for use of a selected set of these indicators in subsequent analyses; and describes the extent of overlap among these NELS:88 indicators.

Chapter 3. Personal and Family Characteristics of Students with Disabilities answers the following questions in terms of the NELS:88 data set: *How can students with disabilities be described in terms of key demographic characteristics, family background and socioeconomic level, and self-concept; and do these descriptions vary across data sources?* More specifically, chapter 3 examines ascribed characteristics such as age, sex, and minority status; contextual characteristics including socioeconomic status, family status (i.e., single-parent household), and parent education; and personal psychological characteristics including self-concept and locus of control.

Chapter 4. Educational Experiences of Students with Disabilities primarily addresses this question: *What types of curricular, extracurricular, and special programs (including special education) comprise the educational experiences of students with and without disabilities?* Specifically, this chapter describes the educational and school-based experiences of these students in terms of significant course-taking patterns (e.g., course enrollment and units taken), grade-level retention, and participation in special or alternative high school programs and extracurricular activities. Where analyses involve data from student transcripts, the eighth-grade to twelfth-grade transcript panel weight (F2TRP1WT) rather than the eighth-grade to twelfth-grade panel weight (F2PNLWT) is used. Exploratory analyses of the participation in special programs of students who were initially excused from NELS:88 because of mental disability (the Base-Year Ineligible, or BYI, sample) and subsequently returned to the sample in the first and second follow-up surveys are unweighted; weights were never developed for students who were not actually sampled.

Chapter 5. Educational Outcomes of Students with Disabilities focuses on these important questions: *What is the academic performance of students with disabilities? To what extent do these students disengage from education entirely? What are their expectations with respect to high school graduation and continued education?* In addressing these questions, chapter 5 focuses on the educational outcomes of students identified in NELS:88 as disabled, including educational achievement, expectations, and disengagement (i.e., dropout status).

Chapter 6. Conclusion and Implications summarizes the key findings of this report related to the characteristics, experiences, and outcomes of students identified in NELS:88 as disabled. It also summarizes findings related to definitions of this population based on NELS:88, and it provides suggestions to help researchers and practitioners who are involved in studying students with disabilities to make effective use of the NELS:88 data set.

Technical Appendices are also included at the end of the report to assist readers of the report and researchers who use NELS:88 data to examine students with disabilities.

Appendix A. NELS:88 Indicators of Disability Status and Comparisons with Other National Data Sets examines the following questions: *How do the national estimates of student disability status provided by major data sets differ? What are the implications of the policy of excluding respondents, including students with disabilities, from national surveys or standardized tests, in terms*

of potential bias and underrepresentation? This appendix supplements the discussion of chapter 2 by providing a list of the actual indicators in NELS:88 related to disability status and disability-related services received. It then compares estimates based on NELS:88 and other sources of the prevalence of students with disabilities in the general population and estimates of the distribution of disabled students among various special education service categories.

Appendix B. NELS:88 Disability Estimates Based on Alternative Disability Definitions addresses primarily these questions: *How consistent are student, parent, teacher, and transcript reports of disability status—with each other and over time? What are the implications of different reports of disability status for the analyses presented in this report?* This appendix supplements chapter 2 as it describes the unweighted sample sizes and the weighted population percentages for the student populations that can be defined from various NELS:88 data sources (i.e., parents, teachers, students, and school officials).

Appendix C. Standard Errors provides the standard errors to accompany each of the data tables presented in the report. Note that these standard errors apply to the point estimates included in the tables; they may not be used to assess statistical significance of particular comparisons, as special standard error estimates were developed in these cases to adjust for nonindependence of the groups being compared.

Appendix D. Technical Notes provides a description of NELS:88 and of the statistical procedures used for this report.

Chapter 2
Identifying Students with Disabilities

One of the challenges of characterizing students as having disabilities, particularly when using extant data sources, is *defining* the population of interest. Since a standardized definition of disability status does not currently exist, various working definitions of disability status have been used to establish eligibility for special education programs, to guide research activities, and to describe specific populations (e.g., in terms of their characteristics and outcomes).

Federal Classification

Currently, under the Individuals with Disabilities Education Act (IDEA), the following disability categories are used for eligibility and reporting:

1. specific learning disability
2. speech or language impairment
3. mental retardation
4. serious emotional disturbance
5. multiple disabilities
6. hearing impairment[3]
7. deafness[3]
8. orthopedic impairment
9. other health impairment
10. visual impairment or blindness
11. autism[4]
12. traumatic brain injury[4]
13. deaf-blindness

Despite the apparently distinct nature of these federal categories, in practice state and local education agencies may apply these definitions differently in determining eligibility for special education services. In fact, the National Center for Educational Outcomes (NCEO) found considerable variation in the use of these categories across 19 national data collection programs that it studied (see OSEP 1994, table 5.8, as cited in Ingels 1995). These differences result in substantial variations among states in the percentages of students identified as eligible for special education services and in the proportions of students identified within the different

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[3] Deafness is sometimes included with hearing impairment as a single category.

[4] Autism and traumatic brain injury (TBI) were added to the list of federal categories in 1990.

disability categories. For example, the *16th Annual Report to Congress on the Implementation of the Individuals with Disabilities Education Act* (OSEP 1994) reported, for the 1991-92 school year, overall percentages of students with disabilities ranging from a low of 5.2 percent in Hawaii to a high of 11.5 percent in Massachusetts; and percentages of students with specific learning disabilities ranging from a low of 2.2 percent in Florida to a high of 7.0 percent in Massachusetts.[5]

Although some amount of these regional variations may reflect actual differences in the relative sizes of disabled populations, much of the variation may be attributed to "differences in either formal or practical definitional criteria, or both" for identifying students with disabilities (Owings and Stocking 1985). Under the IDEA, for example, the term "children with disabilities" refers to children who have been evaluated and found to have a disabling condition that causes them to need special education services; however, many children with impairments do not require special education services, although they may receive remedial education services, accommodations, or other specialized services or instruction. In addition, the variation in the estimated sizes of disabled populations is true particularly for those disability categories that involve greater subjective judgments for classification, such as specific learning disabilities and serious emotional disturbance. (In fact, a controversial plan to change the definition of "serious emotional disturbance" has been under debate for several years—e.g., *The Special Educator*, March 4, 1995.)

In part because of these definitional ambiguities, the very concept of categorizing disabilities has increasingly become a subject of debate. The U.S. Department of Education, for example, has recommended that the collection of state-reported data on children by disability categories be eliminated. This recommendation also includes a provision stating that the law does not require children to be classified by their impairment.

Despite the fact that existing definitions of disability may be applied in various ways, there is an extensive research base on the issues surrounding disability classification for educational purposes. Furthermore, all of the policies mentioned above do share a common construct of disability—i.e., that students must demonstrate a functional disability in one or more major life functions.

International Classification

The definition of disability status is a challenge that goes beyond U.S. boundaries. For example, the World Health Organization has taken steps to develop the International Classification of Impairments, Disabilities, and Handicaps (ICIDH) in order to define and record the incidence of disabilities worldwide in a standardized fashion. The ICIDH represents an ambitious undertaking to distinguish among *impairments* (i.e., chronic health conditions), *disabilities* (i.e., limitations in performing specific activities), and *handicaps* (i.e., disadvantages resulting from these conditions or limitations). Although currently the United States is far from formally adopting this system as a guide to monitoring and reporting on disability status, the impetus provided by the ICIDH to reconsider disability classifications has led to U.S. efforts to clarify the ICIDH system (e.g., Frey et al. 1994). Development of the

[5] These data were abstracted from table AA25 (OSEP 1994). See Appendix A for more details.

ICIDH has also prompted efforts to estimate disability rates based on extant national data sources in accordance with the ICIDH framework (Westat, Inc. 1994).

Classification of Students with Disabilities in National Longitudinal Studies

National longitudinal studies are a potentially rich source of information about students with disabilities. However, since the approaches used to assess disability status in these studies may vary considerably, it is often not possible to compare their results. Consider the differences in approach of three of the most prominent studies undertaken since 1980: the National Longitudinal Transition Study of Special Education Students (NLTS), High School and Beyond (HS&B), and the National Education Longitudinal Study of 1988 (NELS:88). In addition to the discussion below, appendix A contains more details on these national studies.

National Longitudinal Transition Study

The NLTS was a federally mandated, 5-year study that began in 1987. It was the first national study designed specifically to describe the characteristics and transition experiences of secondary school students with disabilities over time. The NLTS included a nationally representative sample of 8,000 secondary special education students, ages 13-21. The student sample was selected from rosters of special education students, classified by federal disability category, which were provided by school districts. Broad in scope, the NLTS gathered baseline and follow-up data on these students in 1987 and 1990 on a wide range of variables including individual and family characteristics, parental expectations, school programs and services, school achievement and completion, and characteristics of employment and postsecondary educational experiences. The study has yielded numerous papers and publications focusing on the secondary and postsecondary experiences of youth with disabilities in general and of specific subpopulations such as youth with serious emotional disturbances and learning disabilities (Wagner et al., 1993).

High School and Beyond

HS&B relied on student self-reports as the primary indicators of disability status, using eight specific disability categories.[6] Secondary indicators were provided by teacher reports that students had or may have had a "physical or emotional handicap that affected [their] schoolwork." In a 1985 NCES report entitled *Characteristics of High School Students Who Identify Themselves as Handicapped*, Owings and Stocking used HS&B data to examine the stability over time of student reports of disability status. They also associated disability status at points in time with indicators of psychological status and school performance to determine the individual-level correlates of perceived disability status. In the course of this work, the

[6] The 1982 HS&B student survey used the following response categories to determine disability status: visual handicap (not correctable by glasses), hard of hearing, deafness, speech disability, orthopedic handicap, other physical disability or handicap, specific learning disability, and none of these conditions. In the first 1980 HS&B survey, because of ambiguous wording, only five categories could be used to identify disability status: hard of hearing, deafness, speech disability, orthopedic handicap, and specific learning disability.

self- versus other-definition of disability status emerged as a topic worthy of further study, along with interest in comparing the experiences of students classified as disabled by self-report and by teacher appraisal.

National Education Longitudinal Study of 1988

NELS:88 did not ask students directly about their disability status. Rather, parents in the base-year NELS:88 survey were the primary source of information related to specific disability status and special services received by eighth-grade students (using 10 disability status and 10 disability service categories, similar though not identical to the federal eligibility categories).[7] On a more limited basis and using different indicators, two teachers for each student also provided their perceptions of whether students may have had disabilities that were affecting their schoolwork. At base year and first follow-up, teachers were asked to indicate whether students had ever fallen behind in school work because of a health problem, and whether students currently had a physical or emotional handicap that was affecting their school work. At first follow-up only, teachers were asked whether students currently had a learning disability that was affecting their school work.[8]

Although not asked to report directly on disability status, students at the first and second follow-ups were asked to report whether they had ever been in a "special program for the educationally or physically handicapped" in high school. In addition, students at the second follow-up were asked whether they were currently in a special education program. School staff at the second follow-up also were asked to provide information on whether a student had been enrolled in a special education program at some time during high school.[9]

Defining Disability Status Using NELS:88

NELS:88 provides four different sources of information related to the disability status of students surveyed: parents, teachers, students, and school officials responsible for providing student transcripts. A variety of survey items and indicators drawn from these sources may be used alone or in combination to define disability status for further analyses. This wealth of

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[7] The NELS:88 parent survey used the following response categories to determine disability status: visual handicap (not correctable by glasses), hearing problem, deafness, speech problem, orthopedic problem, other physical disability, specific learning problem, emotional problem, mental retardation, and other health problem. The survey did not provide a definition for the last category, "other health problem"; see Appendix A for the exact wording of this item. The parent survey used the same categories to probe for receipt of disability-related services.

[8] Teachers were *not* asked at the second follow-up in NELS:88 whether students may have had disabilities or health problems that were affecting their schoolwork.

[9] The variable F2RSPFLG is included in the NELS:88 database to indicate whether the student had participated in a special education program during high school. During the second follow-up (Fall 1992), personnel in approximately 1,500 sampled schools assembled transcripts for students in the NELS:88 sample, following specifications provided by NCES. A "Student Program Identification Sheet" was used to identify students who had been enrolled in a special education program (or a bilingual or gifted program) during high school.

data makes it possible to compare estimates derived from different disability definitions and to select definitions for use that meet a range of conceptual and sample-size requirements.

Students Identified by Parents as Disabled

Parents in the base-year survey were the only respondents in NELS:88 to be asked whether students had a specific disability-related problem and whether they had ever received special services for that problem. Parents could indicate that their child had any one or more of the following 10 disability-related problems and/or services received: visual handicap (not correctable by glasses), hearing problem, deafness, speech problem, orthopedic problem, other physical disability, specific learning problem, emotional problem, mental retardation, or other health problem. In addition, during the base year, parents were asked whether students currently were receiving services for problems related to a learning disability or an orthopedic problem.

Although parents may not be trained professionals in diagnosing disability conditions, their perceptions of their children matter a great deal (i.e., these perceptions may affect their expectations for their children and can shape students' attitudes about themselves). For this reason, these parent-derived indicators of disability status are important to consider. More specifically, these indicators can be used to define populations of disabled students in four ways:

1. having one or more disability-related problems
2. having ever received one or more disability-related services
3. having one or more disability-related problems OR having ever received one or more disability-related services
4. having one or more disability-related problems AND having ever received one or more disability-related services

As has been argued in the literature (e.g., Hodapp and Krasner 1994), the fourth definition may well lessen the inadvertent errors that parents might have made in identifying their children as disabled. In addition, this definition provides some implied indication of agreement on disability status by parents and schools, in that parents indicate disability-related problem(s) and related services received, and such services would be provided only if school staff identify the legitimate need for such service(s). *For these reasons, this definition of disability status likely provides a more reliable basis from which to explore population differences and is the one based on parents' responses that we use for purposes of analysis in this report.*

Students Identified by Teachers as Disabled

In the base-year and the first follow-up NELS:88 surveys, each of two teachers was asked to identify (1) students who had ever fallen behind in school work because of health problems, and (2) students who had physical or emotional handicaps that were affecting their school work. It is important to keep in mind that this method of identification of disability status directly links a student's disability status with his/her classroom performance—a method of identification that differs from the other NELS:88 sources considered in this report and that likely affects the numbers of students that teachers perceived to be disabled.

During the first follow-up only, these two teachers were also asked to identify students who had a learning disability that affected their school work. (In the second follow-up, teachers were not asked any questions related to students' disability or health status.) The teacher-respondents at each of these time-points were not special educators; rather, they were instructional staff selected from the following four subject areas: mathematics, English, science, and social studies.

For this study, teacher responses at the first follow-up were of greatest interest because they included the identification of learning disabled students. Because learning disabilities, for example, may manifest themselves in the contexts of specific subject-matter areas, a student was considered as learning disabled if either teacher described him or her in this way. This approach was also followed for health problems and physical or emotional handicaps; that is, these disabilities were attributed to students if either teacher reported them.

Student Self-identification of Disability Status

Although parents and, to a somewhat lesser degree, teachers are the primary identifiers of student disability status in specific disability categories in NELS:88, the data set does include several disability-related indicators based on student self-reports. Specifically, NELS:88 asked students to report (1) at the first and second follow-ups whether they had ever been in a "special program for the educationally or physically handicapped" in high school (separate indicators for educational and physical handicap), and (2) at the second follow-up whether they were currently enrolled in a special education program. Although these indicators do not provide any sense of the types of disabilities that might have served as the basis for students' responses, they may be used to describe the characteristics of students who perceived themselves (or who may have perceived that others considered them) as disabled in some way.

Since the wording of the student indicators in the first and second follow-ups was identical, it might be expected that responses at the second follow-up would "include" the responses made earlier (i.e., that students surveyed in both follow-ups who responded positively to either item in 1990 would also have responded positively to the identical item in 1992, as both refer to having *ever* been placed in a special program). The data in this case, however, suggest that the two measures are more independent than would be expected. For example, in the case of either reported placement, over one-half of the students who responded to both surveys and reported at first follow-up that they *had ever been* in a special program *no longer reported any such placement by their senior years*. This inconsistency may be the result of students' not remembering their earlier high school experiences, or it may be additional evidence of the transitory nature of selected disability self-identifications (see, for example, Owings and Stocking 1985). In any case, the responses from students to these items at either follow-up appear to provide independent evidence of disability status.

Separate examination of student-defined disabled populations based on NELS:88 first and second follow-up data collections permits interesting comparisons with the data on students' disability status from other sources. For example, the disability population defined by students' first follow-up responses can be compared to the populations defined by the responses of first follow-up teachers. In a similar vein, the population defined by students' second follow-up responses can be compared to the indicator of special education program participation provided by the NELS:88 transcript file, which was based on school officials' judgment (see below). By

combining student samples at each point in time (i.e., sophomores at first follow-up and seniors at second follow-up) who reported participating in programs for *either* the physically or educationally handicapped in high school, we can compare (1) the population estimates derived from these indicators to those based on the first follow-up teacher and second follow-up transcript file indicators, (2) the extent to which these definitions overlap for particular students, and (3) the school-related experiences and outcomes of "self-defined" versus "other-defined" special education students. This latter type of comparison is of particular interest because HS&B used student self-defined measures of disability status, and the differential characteristics of self-defined versus other-defined disabled populations were examined (e.g., Owings and Stocking 1985). In the following chapters, *we limit our focus in this report to the student-defined disabled population identified at the NELS:88 first follow-up, since it is the definition most proximate in time to those provided by parents and teachers*.

Students Identified by School Officials as Disabled

At the time of the NELS:88 second follow-up in 1992, transcripts were requested from all participating students in a sample of 1,500 public and private high schools. At the time transcripts were collected from each school, school officials were asked to complete a checklist for each participating student and to indicate, among other things, whether the student had ever participated in special education programs during high school. The estimates of students participating in special education based on these checklist responses are drawn from two categories: students judged to have participated in special education, and students judged to have participated in *both* special education *and* bilingual education. *At the same time of the second follow-up, 555 students were reported as having been special education participants in high school, and 8 additional students were reported as having been identified as both special education and bilingual education participants* (i.e., a total, when these categories are combined and the transcript weight (F2TRSCWT) is applied, of approximately 4 percent of enrolled high school seniors in 1992). As suggested earlier for future exploratory studies, the population of disabled students identified by school officials may be compared to the population of students at the second follow-up who reported they had ever participated in programs for the educationally or physically handicapped while in high school. This indicator provided by school officials of high school participation in special education programs also provides a measure of the special education services received by students defined as disabled from other data sources (i.e., parents at the base year, and teachers or students at the first follow-up).

Overlap Among Various NELS:88 Definitions of Disability Status

Tables 2.1 and 2.2 provide information on (1) the different sources and definitions of disability status in NELS:88, and (2) the overlap among the populations identified as disabled by the various NELS:88 sources.

Table 2.1 summarizes the alternative definitions of disability status based on NELS:88 that are featured in this report. For each source of disability status (i.e., parents, teachers, students, and school officials), the table indicates both the unweighted number and the weighted percentages of disabled and nondisabled students from each of two samples: (1) the nationally representative cross-sectional sample taken separately at each NELS survey point, and (2) the longitudinal sample of the same cohort of students in each NELS wave. Please note that the clustering of disabilities shown in table 2.1 as identified by parents is based on consideration of

both the similarities of particular disability types and the need for comparability with the other disability indicators available from NELS:88. Also note that a "multiple problems" category has been added to both the parent and teacher definitions so that students identified as having more than one disabling condition can be examined separately, in addition to being included in those disability categories for which they were (also) identified—i.e., a student identified as having two disabling conditions would be counted in two separate disability categories, as well as in the "multiple problems" category.

When these definitions are examined, it is important to keep in mind the differences in the sources of the definitions (i.e., parent, teacher, and school official), the item-wordings that were used to elicit responses from these sources, and the timing of the survey administrations. Differences in perceptions of disability status, for example, and perceived and actual changes in disability status over time can be expected to occur and have been documented (e.g., Owings and Stocking 1985). In short, these different methods of identifying disabled students might be expected to produce rather distinctive student groups, and table 2.2 confirms this by cross-referencing the populations defined in table 2.1.

Table 2.2 strongly suggests that this report examines separate and distinct populations of students and that comparisons among these populations should be made with care. For example, about one-half of the 1,602 students identified by parents in the base year as disabled were similarly identified by teachers at the time of the first follow-up. Of those students identified as disabled by teachers at first follow-up, only 6.3 percent identified themselves at the first follow-up as having been served in special programs for the educationally or physically handicapped. In addition, about one-fifth of the 188 BYI students with mental disabilities (see appendix A) who participated in the first or second follow-up reported having been served in special education programs in high school, while just over half of these students were reported by school officials to have been served.

In this chapter, we have set the stage for the remainder of this report, which will describe the characteristics, educational experiences, and outcomes of students who participated in NELS:88 and were identified as disabled. We have reviewed the differences in the ways various national data sets identify and classify students with disabilities, and we have suggested various indicators from NELS:88 that can be used to describe the experiences of disabled populations. The presentations in appendices A and B supplement the discussion of this chapter by providing additional detail about the NELS:88 indicators related to disability. Specifically, appendix A lists the actual items included on the various NELS:88 surveys that might be used to define disability status or services received and compares disability prevalence estimates based on NELS:88 to those estimated from other selected national surveys and federal disability categories. Appendix B compares estimates based on alternative disability definitions that may be developed for various NELS:88 data sources (i.e., parents, teachers, and students).

Table 2.1— Alternative definitions of disability status using NELS:88

Source and Disability	Variable(s)	Cross-sectional[a] Unwgt. N	Cross-sectional[a] Wgt. %	Longitudinal[a] Unwgt. N	Longitudinal[a] Wgt. %
Parent (base year)		(BYQWT)		(F2PNLWT)	
Not identified		19,517	88.3	13,594	88.7
Identified	**BYP47 and BYP48**	**2,519**	**11.7**	**1,602**	**11.3**
Multiple problems (MULT)[b]	More than one of LD, HP, or PE	321	1.5	181	1.4
Learning disabled (LD)	g or i	1,164	5.4	763	5.3
Health problem (HP)	j	446	1.9	283	1.9
Phys'l/Emot'l problem (PE)	a, b, c, d, e, f, or h	1,257	5.7	754	5.3
Physical disability (P)	e or f	239	1.1	154	1.1
Emotional problem (E)	h	434	2.0	213	1.9
Sensory disability (SE)	a, b, c, or d	668	3.1	429	2.7
Teacher (1st follow-up)		(F1QWT)		(F2PNLWT)	
Not identified		12,337	77.0	11,005	78.0
Identified	**At least one teacher reporting**	**3,534**	**23.0**	**2,913**	**22.0**
Multiple problems (MULT)[b]	More than one of LD, HP, or PE	1,011	6.8	798	6.2
Learning disabled (LD)	F1T1_9	1,606	10.7	1,313	10.2
Health problem (HP)	F1T1_8	1,176	7.5	971	7.1
Phys'l/Emot'l problem (PE)	F1T1_10	1,895	12.8	1,531	12.0
Student (1st follow-up)		(F1QWT)		(F2PNLWT)	
Not identified		17,375	96.8	15,045	97.3
Identified	**F1S34f or F1S34g**	**493**	**3.2**	**362**	**2.7**
(2nd follow-up)		(F2QWT)		(F2PNLWT)	
Not identified		16,090	97.2	14,102	97.7
Identified	**F2S13f or F2S13g**	**380**	**2.8**	**286**	**2.3**
School official (2nd follow-up)		(F2TRSCWT)		(F2TRPIWT)	
Not identified		16,370	96.1	13,689	97.3
Identified	**F2RSPFLG = 1 or 4**	**563**	**3.9**	**368**	**2.7**
Base-year-ineligibles due to mental disability (BYI)[c]		(Unwgt. %)			
BYI present in 1st follow-up	**BYI Flag**	**133**	**0.7**	--	--
BYI present in 2nd follow-up		**156**	**0.8**	--	--

(--) Not available.

(a) "Cross-sectional" refers to the nationally representative sample of students taken at each NELS survey point (i.e., base year, first follow-up, and second follow-up); "Longitudinal" refers to the sample of the same cohort of students followed through each survey wave.

(b) A "multiple problems" category has been added to both the parent and teacher definitions so that students identified as having more than one disabling condition can be examined separately, in addition to being included in those disability categories for which they were (also) identified.

(c) This group includes only those BYI students who were excluded from NELS:88 in the base year for reasons of mental disability. As explained in appendix A, other students were BYI for reasons of physical disability, limited-English proficiency, and unknown factors.

SOURCE: NELS:88 Parent, Teacher, Student Surveys, and Second Follow-up Transcript Component.

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Table 2.2— Overlap among populations identified as disabled by various data sources, for students present for NELS:88 base-year, first, and second follow-up surveys (unweighted percentages)[a]

		Also Identified by:					
Of those identified by:		Parent (BY)	Teacher (1st FU)	Student (1st FU)	Student (2nd FU)	School official (2nd FU)	BYI (1st or 2nd FU)
Parent (BY)	N = 1,602	•	47.0	9.1	9.5	12.4	--
Teacher (1st FU)	N = 2,913	22.4	•	6.3	6.2	8.2	--
Student (1st FU)	N = 362	37.8	55.7	•	26.7	18.2	3.9
Student (2nd FU)	N = 286	45.1	59.8	28.6	•	22.4	5.8
School off. (2nd FU)	N = 368	49.6	69.2	17.9	19.9	•	8.2
BYI (1st or 2nd FU)	N = 188	--	--	17.0	22.0	51.1	•

(•) Not applicable.

(--) Neither the base-year parent survey nor the first follow-up teacher survey included this BYI sample of students (see appendix A).

(a) All included cases have values of the variable F2PNLWT greater than zero.

SOURCE: NELS:88 Parent, Teacher, Student Surveys, and Second Follow-up Transcript Component.

Chapter 3
Background Characteristics of Students with Disabilities

Overview

This chapter describes the background characteristics of students with disabilities, using various definitions of disability status available in NELS:88, as described in chapter 2. Specifically, this chapter compares the background characteristics of these students with the characteristics of students not identified as having a disability, and focuses on two primary sources of information regarding disability status—parents and teachers of the students surveyed in NELS:88. In addition, comparisons are made among students identified as having specific types of disabilities (e.g., learning disability, physical disability, sensory disability) and between parent and teacher reports and student self-definitions of disability status. These comparisons are similar to ones presented in a report on the characteristics of high school students with self-reported disabilities, based on HS&B (Owings and Stockings 1985). In combination, these NELS:88 and HS&B data highlight the differences found between disabled and nondisabled student populations and suggest how different sources of information on disability status may influence findings.

As indicated in chapter 2, the questions posed to *parents* about their children's disability status at the base year (1988) permit students to be identified according to several specific disability categories, in addition to being identified as having or not having a disability-related problem. These parent estimates of disability status, shown in table 2.1, allow the following comparisons to be made: (1) comparisons between students identified as disabled versus students not identified as disabled; (2) comparisons between students in four specific categories of disability—learning disabled (LD), health problems (HP), physical and emotional (PE) problems, and a category for more than one problem or multiple problems—versus students not identified as disabled; and (3) comparisons among students in three specific categories of disability that comprise the more general PE category: physical (P), emotional (E), and sensory-impaired (SE) versus other categories of disabled and nondisabled students.

The questions in NELS:88 posed to *teachers* regarding their perceptions of students' disability status provide the same categorization as those provided by parents except that the teacher questions do not allow the physical and emotional (PE) category to be described in terms of three discrete categories. It is important to note that parent and teacher identifications of disability status are not strictly comparable, as described in chapter 2, because (1) parents' responses are from the base-year survey and teachers' responses are from the first follow-up; and (2) parents and teachers responded to different questions in their respective NELS:88

surveys (e.g., teacher perceptions of students' disability status was linked to their classroom performance, whereas parental identification was linked to whether or not a student received disability-related services).

Analyses in this chapter include only those students who were present in all three NELS:88 surveys (i.e., base year, first follow-up, and second follow-up), weighted to represent students and dropouts who "survived" and participated in the first and second follow-up surveys. Thus, the analyses in this chapter (and chapters 4 and 5) represent a cohort analysis of 8th-graders from 1988 to 1992. The cohort analysis assures us that the differences observed between disabled students as identified by parents versus those identified by teachers are not due to sampling fluctuations across the three surveys.[10] All comparisons that are made in this and in following chapters utilize SUDAAN procedures.[11] Where comparisons might involve "overlapping" cases (e.g., when disabled students identified by parents are compared to those identified by teachers), those cases (i.e., the students identified by both sources as disabled) were removed prior to computation of the statistical tests. See Appendix D for a description of the procedures used in computation of statistical tests for this report. *It is important to note that the standard errors presented in Appendix C are those that correspond to the percentage estimates shown in the report tables (i.e., they include the overlapping cases); they are not the standard errors that were used in the computation of statistical tests when overlapping cases were removed.*

Demographic and Family Characteristics of Students

Tables 3.1, 3.2, 3.3, and 3.4 show the distributions of students identified as disabled, and those not identified, across several key demographic and family characteristics.

Sex

Consistent with previous reports on the sex distribution of students with disabilities (e.g., HS&B, NLTS), male students were typically overrepresented in the population of students with disabilities compared to their proportion in the nondisabled group (table 3.1). For example, 57.8 percent of students identified as disabled by parents were male—by teachers, 54.3 percent,[12] almost the same. Overall, male students represented about one-half (49 percent) of the nondisabled population. Generally, teachers and parents were more likely to identify male students than female students as having disabilities, except in the category of

[10] Fluctuations in the samples are minimized by using the panel of students present in each of the surveys (base year, first and second follow-up). However, there will be differences in the samples of students identified as disabled by parents and the samples of students identified by teachers due to differences in missing data. In addition, the sample sizes may differ slightly within each definition across different characteristics due to some responses having more missing data than others (e.g., there are no missing data for sex, but there are missing data for parents' education).

[11] SUDAAN (SUrvey DAta ANalysis) is a statistical analysis software designed for working with data from complex samples.

[12] Based on student self-reports of disability status, approximately 59.4 percent of the 1982 HS&B sophomore cohort of students with disabilities were male (Owings and Stocking 1985). According to the 1990 NLTS, 68.5 percent of secondary students enrolled in special education programs were male.

health problems, where teachers reported that only 36.7 percent of students with health problems were male, while parents reported 52.1 percent.

Table 3.1— Percentage of students with disabilities, as identified by parents and teachers, who were male, were members of an ethnic/racial minority group, and average age (NELS:88 Second Follow-up Student Survey)[a]

Source of Disability Information	Parent Base Year			Teacher First Follow-up		
Variable	Sex Male	Race Minority[b]	Age[c]	Sex Male	Race Minority[b]	Age[c]
Disability status[d]						
Not identified	49.4	26.9	14.4	48.8	25.0	14.3
Identified	57.8	23.7	14.7	54.3	27.5	14.5
Multiple problems	55.0	28.0	14.6	55.1	27.5	14.6
Learning disabled	63.3	18.3	14.8	63.5	30.5	14.7
Health problem	52.1	29.0	14.5	36.7	23.2	14.4
Physical/emotional problem	53.3	27.9	14.6	55.7	26.0	14.5
Physical disability	48.1	23.9	14.6	--	--	--
Emotional problem	57.0	27.9	14.5	--	--	--
Sensory disability	53.9	27.3	14.6	--	--	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Minority includes Asian or Pacific Islander, Hispanic, black, and American Indian or Alaskan Native.
(c) Mean age is calculated using the BIRTHYR variable; that is, subtracting a student's birthyear from 1988.
(d) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Student Survey.

Minority Status[13]

Similar percentages of parent-identified disabled students and students in the nondisabled population were members of minority groups (23.7 and 26.9 percent, respectively) (table 3.1). Similarly, the minority representation for students identified as disabled by teachers was about the same as their proportion in the nondisabled population (27.5 and 25.0 percent, respectively). This finding holds when looking at differences across white, black, and other

[13] For purposes of analyses of NELS:88 data, minority status is defined to include those students who did not report being "White, not of Hispanic origin" (i.e., students who reported they were Asian or Pacific Islander; Hispanic, regardless of race; black, not of Hispanic origin; or American Indian or Alaskan Native). We also examine results in which we separate black, not of Hispanic origin, from other minorities. Although it has been suggested (e.g., Ingels et al., 1994) that undercoverage bias due to base-year exclusion of students with severe disabilities may affect certain estimates for racial subgroups, it has also been noted that, by the first follow-up survey, coverage of these populations was improved when just about one-half of the excluded disabled students with mental or physical disabilities were returned to the sample.

minority categories (table 3.2); there appears to be no difference in the identification of students with disabilities and no overrepresentation of minorities in the disabled category generally.

The observed proportionate representation of minorities overall in the disabled population in NELS:88 is interesting and would appear to be at odds with current views that minorities are often overrepresented in special education categories (e.g., Special Education Report 1995). However, NELS:88 data do show an overrepresentation of minorities in the learning disabled (LD) category, as defined by the perceptions of teachers. The minority representation among LD students when identified by teachers was 30.5 percent, compared to 18.3 percent when identified by parents. The former result suggests an overrepresentation of minorities in the LD category when identified by teachers and compared to the percentage of minorities among the teacher-defined nondisabled population, while the latter result suggests an underrepresentation of minorities in this category when identified by parent responses and compared to the percentage of minorities among the parent-defined nondisabled population.

Further analyses suggest that these findings for minorities in the LD category were the result of differential identification rates for black students in particular (table 3.2). Additional analyses show that the percentages of students with learning disabilities as identified by parents, for either black students (7.9 percent) or other minority students (10.4 percent), were lower than the percentages of students in the nondisabled category who are black (12.5 percent) or other minority (14.4 percent). In contrast, black students were overrepresented among these students identified as LD by teachers. The percentage of students with teacher-identified learning disabilities who are black was 16.6, compared to 11.3 percent of students in the teacher-identified nondisabled group; 13.9 percent of students identified as LD by teachers were members of other minority groups, compared to 13.8 percent in the nondisabled category. These findings suggest differential perceptions between teachers and parents with regard to disability status and indicate a potential problem for studying students with learning disabilities; namely, the distribution of outcomes may depend on which source of information (parents or teachers) is used to define students with learning disabilities.

Age[14]

Age patterns showed little variation among students perceived to be disabled by either parents or teachers (table 3.1). These disabled populations appeared to be slightly older in eighth grade than their nondisabled peers (about 0.3 years difference for both parents and teachers). For both cases, students identified as LD were the oldest (14.8 and 14.7 years as identified by parents and teachers, respectively). This finding may reflect the higher retention rates of these students in earlier grades, a topic that is discussed in chapter 4.

[14] Age is calculated using the BIRTHYR variable; that is, subtracting a student's birthyear from 1988.

Table 3.2— Percentage of students with disabilities, as identified by parents and teachers, who were of various races (NELS:88 Second Follow-up Student Survey)[a]

Source of Disability Information	Parent Base Year			Teacher First Follow-up		
Variable	Race			Race		
	Black	*White*	*Other*	*Black*	*White*	*% Other*
Disability status [b]						
Not identified	12.5	73.1	14.4	11.3	74.9	13.8
Identified	12.3	76.3	11.4	13.2	72.4	14.3
Multiple problems	16.3	72.0	11.7	13.5	72.5	13.9
Learning disabled	7.9	81.7	10.4	16.6	69.5	13.9
Health problem	18.6	71.0	10.5	9.8	76.8	13.4
Physical/emotional problem	15.0	72.1	12.9	12.2	74.1	13.7
Physical disability	8.4	76.0	15.6	--	--	--
Emotional problem	18.8	72.1	9.1	--	--	--
Sensory disability	13.8	72.7	13.5	--	--	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Student Survey.

Parent Socioeconomic Status and Education Level

Table 3.3 shows the distribution of students identified by parents and teachers as disabled among levels of parents' socioeconomic status (SES) and highest education obtained. The data in this table suggest that SES may play a role in the identification of disability status as reported by teachers but not as reported by parents.

Among students identified as disabled by either parents or teachers, the percentages of students from families in the lowest SES quartile were 27.9 and 27.7 percent, respectively.[15] The distributions of disabled and nondisabled students across SES and education categories were rather similar when looking at the parent-identified students. For the population of students identified as disabled by teachers, the differences in SES and parent education between the disabled and nondisabled groups were more pronounced. Most striking in this teacher-identified population is SES: fewer disabled students than nondisabled students were from families in the upper SES quartiles, and greater numbers of the disabled students were in the lower SES categories, compared to the nondisabled students. Similarly, fewer of these teacher-identified disabled students than nondisabled students had parents with higher levels of education.

[15] These percentages are similar to the finding in HS&B (Owings and Stocking 1985) that 29.5 percent of students with self-reported disabilities were in the lowest SES quartile (1982 HS&B sophomore cohort).

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Within specific disability categories as defined by parents, however, there were some notable differences in the SES distributions of disabled and nondisabled students. For example, the physical disability and sensory impairment categories each included more students in the lowest SES group than did the nondisabled student category (38.5 percent and 31.7 percent, respectively, versus 23.0 percent). These two disability categories also had fewer students in the highest SES group than did the nondisabled category. For students identified by their teachers as having health problems, there were almost no differences in the distributions of disabled and nondisabled students for either SES or for parents' education.

Table 3.3— Percentage of students with disabilities, as identified by parents and teachers, who were in each SES quartile and had parents with various education levels (NELS:88 Base-Year Parent Survey)[a]

Source of Disability Information	Parent Base Year								Teacher First Follow-up							
Variable	SES Quartile				Parents' Highest Education				SES Quartile				Parents' Highest Education			
	Low 1st Q	2nd Q	3rd Q	High 4th Q	< HS	HS	Some College	4yr + College	Low 1st Q	2nd Q	3rd Q	High 4th Q	< HS	HS	Some College	4yr + College
Disability status[b]																
Not identified	23.0	24.6	25.6	26.9	10.1	19.9	42.1	27.9	20.0	24.3	25.7	30.0	7.9	18.9	41.6	31.2
Identified	27.9	25.1	22.1	25.0	10.9	21.5	43.1	24.4	27.7	27.6	24.7	20.0	10.6	23.9	44.5	20.7
Multiple problems	35.4	22.5	23.2	19.0	14.5	17.6	45.9	22.0	30.6	29.5	20.9	19.0	12.3	23.9	45.0	18.4
Learning disabled	24.4	26.6	20.8	28.2	9.1	22.7	41.1	27.2	31.4	28.5	21.0	19.1	12.2	26.2	41.5	19.7
Health problem	32.0	24.9	18.6	24.6	13.5	16.2	46.3	23.9	20.9	25.6	28.1	25.3	9.0	21.1	44.5	25.0
Physical/emotional problem	31.9	22.5	24.7	20.8	12.2	20.8	45.5	21.5	29.4	27.5	24.5	18.6	11.0	22.7	47.0	18.7
Physical disability	38.5	17.0	30.9	13.6	12.3	20.8	48.0	18.9	--	--	--	--	--	--	--	--
Emotional problem	31.6	20.1	26.8	21.5	13.1	20.2	47.9	18.8	--	--	--	--	--	--	--	--
Sensory disability	31.7	25.5	21.3	21.4	11.5	21.4	44.2	23.0	--	--	--	--	--	--	--	--

(--) Not available.

(a) Data represent the eighth-grade panel population.

(b) Percentage represents the distribution within each disability status.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey.

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Family Head of Household

The percentages of disabled students and nondisabled students who live in households headed by single females was about the same when identifications were derived from parent reports (17.0 versus 14.5 percent) (table 3.4). When disability status is based on teacher perceptions, however, students with disabilities generally were more often found in single female-headed households (16.6 versus 12.4 percent). This was true particularly for students identified by teachers as having physical and/or emotional problems.

Table 3.4— **Percentage of students with disabilities, as identified by parents and teachers, who lived in single female-headed households (NELS:88 Base-Year Parent Survey)[a]**

Source of Disability Information	Parent Base Year	Teacher First Follow-up
Variable	% Female-headed household at BY	% Female-headed household at BY
Disability status [b]		
Not identified	14.5	12.4
Identified	17.0	16.6
Multiple problems	20.0	17.6
Learning disabled	14.6	14.3
Health problem	14.2	15.6
Physical/emotional problem	20.0	18.0
Physical disability	16.2	--
Emotional problem	28.9	--
Sensory disability	17.9	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey.

Psychological Profiles of Students

Given the special challenges many students with disabilities face at school, it is interesting to assess their psychological well-being and to compare it to that of their nondisabled counterparts. Measures such as self-concept and locus of control may reveal attitudes that importantly affect performance, including creative risk-taking on classroom assignments and confidence in tackling new subject areas (Strube and Roemmele 1985). One might expect that the psychological health of students with disabilities is lower than that of nondisabled students, as a result of both perceiving themselves to be different from other students and feeling themselves to be regarded as less able by others, teachers and parents as well as students.

NELS:88 asked students to respond to a series of questions intended to measure their psychological state—specifically, questions related to their self-concept and locus of control.[16] Students responded to this series of questions at three successive points in time: as 8th- graders during the NELS:88 base-year survey, as sophomores during the first follow-up, and as seniors during the second follow-up.

Tables 3.5 and 3.6 provide measures at these three points in time for locus of control and self-concept, respectively. Both measures reflect students' scaled responses to the items related to each of the two psychological variables, which were designed to be comparable with similar scales used in HS&B. In NELS:88, the locus of control scale was an average of six items (e.g., "Chance and luck are very important for what happens in my life"), which were standardized separately to a mean of 0 and a standard deviation of 1; all nonmissing components were averaged. A higher positive score on this scale indicates a higher level of internal control (i.e., the sense of having some control of one's life).

Those students identified as disabled by either their parents or teachers evidenced lower levels of internal control than students not so identified, and this difference was reasonably stable from 1988 to 1992 (table 3.5). Interestingly, students identified by parents as having either health problems or physical disabilities did *not* differ from nondisabled students in their responses to the locus of control items.

The NELS:88 self-concept scale was an average of a different set of seven items (e.g., "I feel good about myself"), which were also standardized to a mean of 0 and a standard deviation of 1. As with locus of control, higher scores on this scale represent higher levels of self-concept.

The pattern of self-concept scores among students identified as disabled by teachers was similar to that found for locus of control (table 3.6). Students perceived to be disabled by their teachers evidenced consistently lower levels of self-concept than did nondisabled students. Lower self-concept scores were also found for teacher-identified disabled students (when compared to students not so identified) in each of the specific disability categories over time. For students identified as disabled by parents, the pattern of these scores was less consistent across specific disability categories and across time. Only in the LD category, for example, was there a consistent pattern of difference over time between disabled and nondisabled students.

---

[16] *Self-concept* refers to an individual's positive or negative perceptions of self, also referred to as self-esteem. *Locus of control* refers to an individual's perceptions of the relationship between his or her own actions and the events in his or her life.

Table 3.5— Mean locus of control scores, over time, of students with disabilities (NELS:88 Base-Year, First, and Second Follow-up Student Surveys), as identified by parents and teachers[a]

Source of Disability Information	Parent Base Year			Teacher First Follow-up		
Variable	Base Year	First Follow-up	Second Follow-up	Base Year	First Follow-up	Second Follow-up
Disability status [b]						
Not identified	0.05	0.04	0.06	0.10	0.09	0.11
Identified	-0.19	-0.17	-0.20	-0.12	-0.19	-0.17
Multiple problems	-0.34	-0.10	-0.34	-0.20	-0.27	-0.24
Learning disabled	-0.24	-0.28	-0.27	-0.22	-0.26	-0.28
Health problem	-0.11	0.07	-0.17	0.01	0.00	-0.03
Physical/emotional problem	-0.21	-0.14	-0.19	-0.17	-0.25	-0.20
Physical disability	-0.10	-0.09	-0.11	--	--	--
Emotional problem	-0.38	-0.11	-0.28	--	--	--
Sensory disability	-0.15	-0.18	-0.20	--	--	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Locus of control score is standardized; mean = 0, s.d. = 1.0. Positive locus of control scores indicate greater internal control, while negative scores indicate less internal control.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, First and Second Follow-up Student Surveys.

Table 3.6— Mean self-concept scores, over time, of students with disabilities (NELS:88 Base-Year, First, and Second Follow-up Student Surveys), as identified by parents and teachers[a]

Source of Disability Information	Parent Base Year			Teacher First Follow-up		
Variable	Base Year	First Follow-up	Second Follow-up	Base Year	First Follow-up	Second Follow-up
Disability status [b]						
Not identified	0.01	0.01	0.03	0.03	0.04	0.04
Identified	-0.09	-0.07	-0.14	-0.08	-0.13	-0.10
Multiple problems	-0.14	0.04	-0.10	-0.13	-0.25	-0.12
Learning disabled	-0.13	-0.12	-0.19	-0.11	-0.14	-0.13
Health problem	-0.01	0.09	-0.04	-0.08	-0.09	-0.12
Physical/emotional problem	-0.08	-0.06	-0.11	-0.11	-0.18	-0.09
Physical disability	-0.15	-0.15	-0.14	--	--	--
Emotional problem	-0.14	0.00	-0.06	--	--	--
Sensory disability	-0.05	-0.05	-0.15	--	--	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Self-concept score is standardized; mean = 0, s.d. = 1.0. Positive self-concept scores indicate greater internal control, while negative scores indicate less internal control.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, First and Second Follow-up Student Surveys.

The results from analyses of locus of control and self-concept measures for students identified as disabled by teachers were consistent with reports from the HS&B data, which showed that students who identified themselves as "handicapped" had lower locus of control and self-esteem scores than students who did not identify themselves in this way (Owings and Stocking 1985). In contrast, for students identified as disabled by parents, consistently lower scores were found only for locus of control. Interestingly, results presented later in this chapter (see table 3.9) for students who *identified themselves* as disabled in NELS:88 correspond to the results based on parent perceptions; although differences between disabled and nondisabled students exist for locus of control, differences in self-concept scores are not apparent.

Characteristics of School Environment

Table 3.7 shows the distribution of students with and without disabilities across two general measures of school environment—urbanicity and SES (as expressed by the percentage of students receiving free or reduced-price lunches at school). As shown, few differences were found between disabled and nondisabled students in terms of the school's geographic context or SES. According to both parent and teacher perceptions, students with and without disabilities were similarly distributed in rural, urban, and suburban locations, and the proportion of students receiving free or reduced-price lunches was about the same: just under one-quarter for both groups. The similarity between the nondisabled and disabled populations persists within the specific disability categories, except for students identified by parents as having emotional or physical disabilities. Students whose parents said they have emotional problems and have ever received services for these problems were less likely to be found in rural schools (20.9 percent) and were slightly more likely to be found in urban (29.1 percent) and suburban (50.0 percent) schools than their nondisabled counterparts.

Table 3.7— Percentage of students with disabilities, as identified by parents and teachers, who were in different school environments and who received free or reduced-price lunch (NELS:88 Base-Year School Survey)[a]

Source of Disability Information	Parent Base Year				Teacher First Follow-up			
Variable	Urban	Suburban	Rural	Avg. % of students in school lunch program [b]	Urban	Suburban	Rural	Avg. % of students in school lunch program [b]
Disability status [c]								
Not identified	25.0	43.4	31.5	23.9	22.6	44.7	33.1	22.8
Identified	23.8	45.7	30.5	24.0	23.0	43.7	33.4	24.3
Multiple problems	27.2	40.8	32.0	28.1	22.7	44.4	33.0	24.4
Learning disabled	24.2	43.7	32.2	20.9	21.7	45.0	33.3	23.4
Health problem	24.1	43.5	32.4	26.0	23.8	42.5	33.7	22.1
Physical/emotional problem	24.0	47.4	28.6	26.8	22.8	43.3	33.9	25.0
Physical disability	16.2	51.6	32.1	23.5	--	--	--	--
Emotional problem	29.1	50.0	20.9	28.2	--	--	--	--
Sensory disability	22.5	44.4	33.1	26.6	--	--	--	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) "School lunch program" refers to free or reduced-price school lunch program.
(c) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Base-Year School Survey.

Characteristics of Students Who Report Themselves to be Disabled

The previous tables in this chapter described students in NELS:88 who were identified by parents and teachers as having disabilities, compared to students not identified in these ways. Tables 3.8 and 3.9 examine some of these same characteristics—specifically, sex, race, SES, locus of control, and self-concept—for those students who identified themselves as disabled. The distributions of these students in terms of sex and minority status were similar to the distributions shown in table 3.1 for either parent- or teacher-identified students (table 3.8). Regardless of which of these respondents identified a student as disabled, disproportionately more were male. Of the students who identified themselves as disabled, 60.8 percent were male, compared to 49.7 percent of the nonidentified group. In addition, this self-identified population had about the same percentage of minority students as the nondisabled population (25.9 versus 27.2 percent). Finally, in terms of socioeconomic status, self-identified students were distributed similarly across SES quartiles to nondisabled students.

Table 3.8— Percentage of students who identified themselves as disabled, who were male, members of minority groups, and in various SES quartiles (NELS:88 Base-Year Student and Parent Surveys)[a]

Source of Disability Information	Student-Identified Disability at First Follow-up					
Variable			SES Quartiles			
	Sex % Male	Race % Minority	Low 1st Q	2nd Q	3rd Q	High 4th Q
Disability status [b]						
Not identified	49.7	27.2	22.0	24.9	25.5	27.6
Identified	60.8	25.9	24.5	28.8	24.0	22.6

(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); First Follow-up Student Survey, Base-Year Student and Parent Surveys.

Table 3.9 displays the self-concept and locus of control scores of students who identified themselves as disabled. As discussed earlier, these results are generally consistent with the patterns observed for disabled students identified by parents, but not by teachers. For example, the self-concept scores of self-identified disabled (-0.03) and nondisabled (0.01) students were about the same. For the locus of control measure, however, students who self-identified as disabled clearly scored lower on average than their nondisabled counterparts (-0.18 versus 0.06). This pattern is consistent with the one observed for students perceived to be disabled by either parents or teachers.

Table 3.9— Mean self-concept and locus of control scores of students who identified themselves as disabled (NELS:88 Second Follow-up Student Survey)[a]

Source of Disability Information	Student-Identified Disability at First Follow-up	
Variable	Self-concept at 2nd Follow-up	Locus of control at 2nd Follow-up
Disability status [b]		
Not identified	0.01	0.06
Identified	-0.03	-0.18

(a) Data represent the eighth-grade panel population.
(b) Self-concept and locus of control scores are standardized; means for both = 0, s.d. = 1.0.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); First Follow-up Student Survey, Second Follow-up Student Survey.

Summary

Differences in the background characteristics among the various disabled and nondisabled student populations in NELS:88 are apparent across several important dimensions, and the nature of these differences depends upon the source of information (parent, teacher, or student) used to identify students as disabled or nondisabled. In addition, results vary depending upon whether comparisons are made between the overall population of students identified as disabled or nondisabled or among selected disability categories.

For example, students identified as disabled by their teachers or parents, as well as students who identified themselves as disabled, were more likely to be male than their nondisabled counterparts. For the specific category of health problems, however, teachers identified fewer males than were represented in the nondisabled population (36.7 percent versus 48.8 percent, respectively). In the case of minority status, the percentage of teacher-, parent-, and self-identified disabled students who were minorities was proportionate to the nondisabled population. At the same time, teachers were more likely than parents to identify minority students as learning disabled (30.5 percent versus 18.3 percent, respectively). Finally, the psychological profiles of students identified as disabled by parents, teachers, and students themselves evidenced a consistent pattern over time of lower scores on locus of control measures. In contrast, measures of self-concept were consistently lower over time only for students whose teachers perceived them to be disabled, as compared to nondisabled students.

Chapter 4
The School Experiences of Students with Disabilities

Overview

Chapter 3 examined how the background characteristics of students with disabilities differed from the population of nondisabled students in NELS:88, and showed that the distributions of students with these characteristics depend upon the source of information used to define disability (e.g., whether parent or teacher responses were used to identify the student). In this chapter, a similar approach is used to examine the high school experiences of students perceived to have disabilities. Four general areas of the high school experience are the focus of discussion: (1) students' retention and participation in remedial and dropout prevention programs; (2) students' participation in programs designed to meet special educational needs; (3) students' academic experiences; and (4) students' and parents' involvement in extracurricular activities at school. As in chapter 3, this discussion highlights comparisons between populations of students with and without disabilities as a whole as identified by different sources, and across distinct disability categories. The comparison of students identified and not identified with disabilities in terms of their participation in special education programs serves two purposes: (1) it provides an estimate of the overall proportion of students served in these special programs, and (2) it provides a further check on the reliability of disability identifications made by parents and teachers.

Retention and Participation in Remedial and Dropout Prevention Programs

The high school experiences of students with disabilities are likely to be affected by students' successes and failures in earlier grades. Retention in grades prior to high school, for example, may result in students' being older than their peers in high school. Retention may also have a stigmatizing effect, from which some students undoubtedly find it difficult to recover.

Table 4.1 shows the distribution of students whose parents reported they had ever repeated a grade prior to the eighth grade. Students identified as disabled by either parents or teachers more often repeated a grade than did students not identified. Parents reported that 40.7 percent of the identified students had repeated one or more grade levels prior to eighth grade, compared to 17.0 percent of the students not identified as disabled. Similar findings hold for those students identified by teachers as disabled: 30.8 percent of these students were reported to have repeated grades, compared to only 11.5 percent of the students not identified.

Examining specific categories of disability, it appears that students identified as learning disabled (LD) by either parents or teachers showed a higher incidence of retention than students in other disability categories or in the overall population of students identified as disabled. Among students identified as LD by their parents and teachers, 52.8 percent and 42.8 percent, respectively, had been retained prior to eighth grade.

Table 4.1— Percentage of students with disabilities, as identified by parents and teachers, who ever repeated a grade prior to eighth grade (NELS:88 Base-Year Parent Survey)[a]

Source of Disability Information	Parent Base Year	Teacher First Follow-up
Variable	% Repeated grade before eighth grade	% Repeated grade before eighth grade
Disability status [b]		
Not identified	17.0	11.5
Identified	40.7	30.8
Multiple problems	43.0	37.6
Learning disabled	52.8	42.8
Health problem	25.0	19.7
Physical/emotional problem	35.6	30.5
Physical disability	35.8	--
Emotional problem	43.4	--
Sensory disability	33.2	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey.

Table 4.2 shows data for students identified as disabled by their parents or teachers who reported themselves to have been in a remedial course or program for English and/or mathematics during high school. Once again, students identified as disabled were more likely than nondisabled students to report participation in high school remedial mathematics and English programs. Approximately 35 percent of parent-identified disabled students reported having participated in remedial mathematics and remedial English programs, compared to fewer than 20 percent of the nondisabled students. For teacher-identified students with disabilities, 35.3 percent had participated in remedial mathematics courses, compared to 17.5 percent of the nondisabled students.

Examining specific categories of disability, students identified as LD by parents or teachers showed a higher incidence of participation in remedial courses than students in other disability categories. From 40 to 50 percent of these students had been in high school remedial programs. Students identified as having a health problem (HP) appear to be different from other disabled students and more similar to nondisabled students in terms of having participated in remedial mathematics or English courses; that is, 19.5 percent of the parent-identified HP group had participated in a remedial English program, compared to 17.8 percent

of the nondisabled students. The level of participation in remedial programs for teacher-identified HP students was higher than that for nondisabled students but lower than that for students in the other disability categories. These data suggest that students with health problems may have had educational experiences that were distinct from those of students identified in other disability categories.

Table 4.2— Percentage of students with disabilities, as identified by parents and teachers, who reported ever having participated in remedial English or mathematics programs during high school (NELS:88 Second Follow-up Student Survey)[a]

Source of Disability Information	Parent Base Year		Teacher First Follow-up	
Variable	% Ever in remedial		% Ever in remedial	
	English	*Math*	*English*	*Math*
Disability status [b]				
Not identified	17.8	19.9	15.7	17.5
Identified	34.9	36.3	33.0	35.3
Multiple problems	37.9	47.8	38.1	37.5
Learning disabled	49.6	50.3	43.1	41.0
Health problem	19.5	23.3	24.1	26.1
Physical/emotional problem	27.7	32.1	32.0	37.1
Physical disability	23.7	24.7	--	--
Emotional problem	35.6	50.0	--	--
Sensory disability	27.6	27.7	--	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Student Survey.

In addition to participation in high school remedial programs, students at the second follow-up were asked if they had ever been in a dropout prevention program in high school. Students identified as disabled reported a higher level of participation in dropout prevention programs than did their nondisabled counterparts (table 4.3). This difference in reported participation is most pronounced among students perceived by their teachers to be disabled. Among students identified by teachers, 4.2 percent reported participation in dropout prevention programs, compared to 1.1 percent of those not identified. For students identified by parents, the participation rates between disabled and nondisabled students were about the same: 2.9 percent versus 2.1 percent, respectively. Students reported lower levels of participation in dropout prevention programs than in the remedial programs shown in table 4.2, a finding that may be partly explained by the fact that remedial courses and programs are typically more available than dropout prevention programs in high schools.

Table 4.3— Percentage of students with disabilities, as identified by parents and teachers, who reported having participated in high school dropout prevention programs (NELS:88 Second Follow-up Student Survey)[a]

Source of Disability Information	Parent Base Year	Teacher First Follow-up
Variable	Ever participated in program for dropout prevention	Ever participated in program for dropout prevention
Disability status [b]		
Not identified	2.1	1.1
Identified	2.9	4.2
Multiple problems	4.7	5.8
Learning disabled	3.0	4.2
Health problem	5.4	3.4
Physical/emotional problem	2.6	5.1
Physical disability	3.9	--
Emotional problem	5.4	--
Sensory disability	1.4	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Student Survey.

Participation in Special Education Programs

Of particular interest to groups concerned about the educational well-being of students with disabilities is the extent to which these students participate in school-based programs designed specifically to meet their special needs. NELS:88 provides information to address this issue from student self-reports, the reports of school officials, and the reported experiences of students excused from the base-year survey for reasons of disability who had returned to the study by the time of the second follow-up.

At the second follow-up, NELS:88 participants were asked to report whether they had ever participated in a "special program for the educationally handicapped" or a "special program for the physically handicapped" during high school. Table 4.4 summarizes students' self-reported participation in these special programs. As might be expected, students with disabilities reported having participated in these special programs to a greater extent than did their nondisabled counterparts. This finding holds true for students identified as disabled by their parents or teachers, although the levels of participation in programs for the educationally handicapped, for example, appear to be higher for students identified by parents. Nondisabled students reported a low level of participation in these special programs (from 0.5 percent participation in programs for the physically handicapped to 1.1 percent participation in programs for the educationally handicapped). In contrast, 11.2 percent of parent-identified disabled students and 4.5 percent of teacher-identified disabled students reported participation in programs for the educationally handicapped. Differences in the reported participation in

programs for the physically handicapped between the disabled and nondisabled as identified by teachers were less striking.

Examining disabled versus nondisabled differences across specific disability categories identified by parents and teachers reveals consistently higher levels of participation in programs for the educationally handicapped among learning disabled students and students with multiple problems.[17] About 22 percent of students identified by parents in each of these two disability groups, and between 7 and 8 percent of students identified by teachers in each group, reported having participated in a program for the educationally handicapped while in high school.

Table 4.4— Percentage of students with disabilities, as identified by parents and teachers, who reported having participated in programs for the educationally or physically handicapped (NELS:88 Second Follow-up Student Survey)[a]

Source of Disability Information	Parent Base Year		Teacher First Follow-up	
Variable	Ever participated in program for:		Ever participated in program for:	
	Educationally handicapped	Physically handicapped	Educationally handicapped	Physically handicapped
Disability status [b]				
Not identified	1.1	0.5	0.8	0.5
Identified	11.2	4.5	5.3	2.0
Multiple problems	22.1	4.4	7.0	4.4
Learning disabled	21.8	7.3	8.0	3.1
Health problem	2.5	1.5	2.8	1.3
Physical/emotional problem	7.7	2.7	4.5	2.3
Physical disability	7.9	8.3	--	--
Emotional problem	13.5	0.8	--	--
Sensory disability	5.3	1.8	--	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Student Survey.

[17] These comparisons involve no "overlapping" cases, but they do include students with other disabilities in addition to the focal disability in the focal group for the comparison (see the discussion in Appendix D).

As discussed in chapter 2, school officials were asked, as part of the NELS:88 second follow-up, to identify those students who had ever been enrolled in high school special education programs, and a flag indicating such participation was entered in the students' second follow-up transcript file.[18] Table 4.5 shows the percentages of students by disability status reported by school officials to have participated in special education during high school. The pattern of participation in special education for these students, across disability categories based on parent and teacher reports, is similar to the pattern shown in table 4.4, although the levels of participation are different. The NELS:88 transcript files indicate participation in special education programs by 11.9 percent of students identified as disabled by parents, and by 7.8 percent of students identified by teachers. The levels of participation were highest for students with learning disabilities or multiple problems: about 20 percent participation for both groups of students identified by parents, and, among students identified by teachers, 13.7 percent for students with learning disabilities and 12.1 percent for students with multiple problems.

Table 4.5— Percentage of students with disabilities, as identified by parents and teachers, who participated in special education (NELS:88 Second Follow-up Transcript Component)[a]

Source of Disability Information	Parent Base Year	Teacher First Follow-up
Variable	Participated in special education	Participated in special education
Disability status [b]		
Not identified	1.5	1.0
Identified	11.9	7.8
Multiple problems	20.2	12.1
Learning disabled	20.3	13.7
Health problem	7.8	2.8
Physical/emotional problem	9.7	6.2
Physical disability	9.3	--
Emotional problem	13.2	--
Sensory disability	11.3	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status; percentages are derived using the 8th-12th grade transcript panel weight (F2TRP1WT).
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Transcript Component.

Interestingly, the data presented in table 4.4 indicate relatively low levels of high school participation in special programs for the educationally and physically handicapped, as perceived and reported by students who were identified by parents or teachers as disabled

[18] The NELS:88 second follow-up transcript file includes a flag (F2RSPFLG) that indicates whether the student ever participated in a special education program (i.e., had an Individualized Education Plan, or IEP) during high school.

(i.e., from 2.0 to 11.2 percent of identified students).[19] School officials identified similarly low percentages of these students as having participated in special education (table 4.5). In contrast, a much larger proportion of these identified students reported having participated in remedial English and mathematics courses during high school (i.e., from 33.0 to 36.3 percent). These differences in reported participation rates for special education and remedial courses might be attributed to several factors, such as more numerous offerings of remedial courses than designated special education programs in high schools; increased inclusion or "mainstreaming" of special education students into general education programs, including remedial courses; the accuracy and completeness with which school officials identified students who had been enrolled in special education programs during high school; and students' knowledge and perceptions of the specific courses and programs in which they are enrolled. For example, students may simply not be aware of the specific programs or services they are receiving. Alternately, they may be more likely to identify a special education class as a remedial class, either because that is the way the class appears to them or because doing so enables them to feel less labeled, segregated, or different from other students.

Participation of Base-Year Ineligible Students in Remedial, Dropout Prevention, and Special Education Programs

Another way of examining the extent to which students with disabilities appear to participate in special programs in high school is provided in NELS:88 by the population of 188 students who were excused from participation in the base-year NELS:88 survey on the basis of mental disability, but who returned to participate in the first or second follow-up.[20] Of this sample of base-year ineligible (BYI) students, 42 percent reported having participated in a remedial English class, 44.6 percent participated in a remedial mathematics class, and 4.5 percent participated in a dropout prevention program.[21] These levels of participation in remedial classes and dropout prevention programs appear generally higher than the levels of participation reported for students who were identified as disabled by their parents and teachers. This may not be too surprising since the BYI students might be assumed to have had more significant cognitive impairments than the overall population of students with disabilities; as a result, they might well have been expected to need additional special services in school. It is interesting to note, however, that only 17.9 percent of these BYI students

[19] The low participation rates of disabled students identified by parents do not reflect the base-year-ineligible (BYI) students who would likely have accounted for a substantial proportion of those students enrolled in explicitly designated special education programs. For teacher-identified disabled students, BYI students who returned to the NELS:88 sample at the first follow-up would have been included in the calculation of these rates.

[20] This base-year ineligible, or BYI, sample who participated in NELS:88 follow-up surveys included 188 students who were identified during the base year as ineligible to participate in NELS on the basis of mental disability. As described in chapter 3 this population likely represents students with mental retardation or severe learning disabilities.

[21] Analyses involving BYI students in this report are based on the sample of these students; that is, case weights are not used. Weights were never developed for students who were not actually sampled.

reported ever having been in a special program for the educationally handicapped.[22] This percentage is in the range of the 21.8 percent participation among parent-identified LD students, and would appear to be higher than the 8.0 percent among teacher-identified LD students.

Academic Experiences of Students with Disabilities

Table 4.6 shows the distribution of students in terms of total high school credit units in math, English, and science for students in the twelfth grade in 1992, as reported on their high school transcripts. Students identified as disabled by parents or teachers consistently earned fewer units in all three areas compared to nondisabled students. The magnitude of these differences was greater for students identified as disabled by teachers than it was for students identified by parents; the difference between teacher-identified disabled students and the nondisabled was about 0.7 units on average, while the difference was about 0.5 units for those identified by their parents as disabled. This finding is likely due to the fact that teachers' identifications of disability status were tied to their assessments of students' classroom performance.

Differences across specific disabilities were not great; however, students identified by parents as having an emotional disability or multiple problems attained fewer credits in each academic area compared to students in the other disability categories. Students with health problems, as identified by teachers, earned slightly more credits in each area compared to students in the other disability categories. When compared to nondisabled students, however, these teacher-identified HP students also earned fewer units in each of the three subject areas.

Participation in Extracurricular and PTA Activities

Participation in school activities is another facet of the high school experience in which disabled and nondisabled students may differ. On the one hand, the very nature of some specific disabilities may preclude disabled students from extracurricular activity participation; on the other hand, the possible stigma of having been identified as disabled may preclude these students from selection or acceptance in the activities by their peers. Participation of parents in school-related activities, such as parent-teacher associations (PTA), may also be affected by students' disability status. In this case, however, it is as easy to predict active parental involvement owing to greater concerns for disabled sons or daughters as it is to predict reduced or noninvolvement resulting from a recognition that their sons and daughters may not be active participants in the "social" life of the school.

Table 4.7 explores students' participation in sports and in school clubs or school government at the time of the NELS:88 second follow-up survey, and parents' participation in PTA activities at the time of the base-year survey. Parents' activities reflect whether they attended PTA meetings regularly and whether they were active participants. For students, the values represent the number of sports in which they participated (summed over three possible sports activities in which students might have indicated they had taken part) and the number of

[22] Only 2.7 percent of these BYI students reported having participated in a special program for the physically handicapped; however, this group of students had been excused from NELS:88 participation because of mental disability, and therefore would not be expected to participate in such programs.

school clubs or programs to which they belonged (summed over nine possible school activities).

Table 4.6— Total units in core subjects completed by students with disabilities (NELS:88 Second Follow-up Transcript Component), as identified by parents and teachers[a]

Source of Disability Information	Parent Base Year			Teacher First Follow-up		
Variable	2nd Follow-up			2nd Follow-up		
	Average English units	Average math units	Average science units	Average English units	Average math units	Average science units
Disability status						
Not identified	3.7	2.9	2.7	4.0	3.1	2.9
Identified	3.2	2.4	2.2	3.3	2.3	2.2
Multiple problems	2.7	2.5	1.9	3.0	2.1	2.0
Learning disabled	3.1	2.3	2.1	3.1	2.2	2.1
Health problem	3.0	2.4	2.1	3.5	2.6	2.4
Physical/emotional problem	3.2	2.6	2.1	3.1	2.2	2.1
Physical disability	3.2	2.6	2.3	--	--	--
Emotional problem	2.9	2.5	1.8	--	--	--
Sensory disability	3.1	2.4	2.2	--	--	--

(--) Not available.

(a) Data represent the eighth-grade panel population; percentages are derived using the 8th-12th grade transcript panel weight (F2TRP1WT).

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Transcript Component.

The results show relatively similar levels of participation on the parts of both parents and students regardless of disability status when disability was identified by parents (table 4.7). In contrast, for disabled students identified by teachers, there was a consistent lower level of participation by parents of the disabled and by the disabled students themselves.

Within the specific disability groups identified by parents, two differences emerge regarding parental participation in schools and student participation in activities. First, parents of students with multiple problems and parents of students with emotional problems were less active participants in PTA programs than were the parents of students in the other disability categories. Fewer than 15 percent of parents of students with these disabilities reported active PTA involvement, as compared to the near-to-above 20 percent participation rates for the parents of other disabled students. Second, while students with physical disabilities evidenced significantly lower levels of participation in sports, they were as active in school activities (e.g., participation in government and clubs) as students with other disabilities.

Table 4.7— Percentage of students with disabilities, as identified by parents and teachers, who were involved in school sports and extracurricular activities and whose parents were involved in PTA (NELS:88 Base-Year Parent and Second Follow-up Student Surveys)[a]

Source of Disability Information	Parent Base Year				Teacher First Follow-up			
Variable	Parent involvement		Student involvement		Parent involvement		Student involvement	
	% Attend PTA	% Active PTA	Avg. # sport activities	Avg. # school activities	% Attend PTA	% Active PTA	Avg. # sport activities	Avg. # school activities
Disability status [b]								
Not identified	36.4	26.2	0.6	1.5	37.3	27.9	0.6	1.6
Identified	35.3	23.8	0.5	1.2	33.4	23.6	0.5	1.3
Multiple problems	31.5	13.3	0.5	1.0	34.3	24.3	0.4	1.1
Learning disabled	32.4	23.5	0.6	1.0	34.8	25.9	0.6	1.2
Health problem	39.8	29.0	0.4	1.4	33.1	22.2	0.4	1.4
Physical/emotional problem	35.8	19.3	0.5	1.3	32.4	24.1	0.4	1.2
Physical disability	36.9	20.9	0.3	1.7	--	--	--	--
Emotional problem	30.6	14.5	0.6	1.0	--	--	--	--
Sensory disability	37.4	21.4	0.5	1.2	--	--	--	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, and Second Follow-up Student Surveys.

Experiences of Students Who Report Themselves to be Disabled

Table 4.8 examines students' participation in remedial programs from the perspective of students who identified themselves as disabled. The results are similar to those reported in table 4.2. As with those students identified as disabled by parents and teachers (see table 4.2), this self-identified group of students reported higher levels of participation in remedial English and remedial mathematics programs than did the nondisabled population. They also were more likely to be in a mathematics (42.9 percent) versus an English remedial program (32.1 percent), while for students identified by both parents and teachers (see table 4.2), participation rates in remedial mathematics and English programs were about the same (e.g., 35.3 percent versus 33.0 percent for students identified by teachers).

Table 4.8— Percentage of students who identified themselves as disabled who participated in remedial English or remedial math programs in high school (NELS:88 Second Follow-up Survey)[a]

Source of Disability Information	Student-Identified Disability at 1st Follow-up	
Variable	% Ever participated in:	
	Remedial English	Remedial math
Disability status [b]		
Not identified	18.7	20.3
Identified	32.1	42.9

(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); First Follow-up Student Survey, Second Follow-up Student Survey.

It is interesting also to look at the levels of participation in sports and other school activities among students who identified themselves as disabled, as well as the participation of their parents in school-related activities like PTA. Table 4.9 shows the reported involvements in extracurricular activities and PTA of these students and their parents. In general, it appears that this self-identified group of students and their parents participated in school-related activities to a similar extent as those students identified by their parents as disabled (see table 4.7).

Table 4.9— Percentage of students who identified themselves as disabled who were involved in school sports and extracurricular activities and whose parents were involved in PTA (NELS:88 Base-Year Parent and Second Follow-up Student Surveys)[a]

Source of Disability Information	Student-Identified Disability at First Follow-up			
Variable	Parent involvement		Student involvement	
	% Attend PTA	% Active PTA	Avg. # sport activities	Avg. # school activities
Disability status [b]				
Not identified	36.8	26.7	0.6	1.5
Identified	31.4	27.2	0.6	1.2

(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); First Follow-up Student Survey, Base-Year Parent and Second Follow-up Student Surveys.

Summary

Just as chapter 3 indicated differences in the background characteristics of students identified as disabled and those not identified, this chapter also shows consistent differences between the high school experiences of disabled and nondisabled students. These differences were largest in the areas of participation in special and remedial high school programs (disabled students participated more), and in credits accumulated in the core curriculum (disabled students earned fewer credits). Although some differences appear in the school experiences of students perceived to be disabled by different individuals (e.g., parents, teachers, school officials, or the students themselves), these differences were much less evident here than in chapter 3.

One of the more interesting findings in this chapter concerns the extent to which students identified as disabled actually participated in special education programs during high school. The data suggest that relatively small percentages of these students reported themselves or were reported by school officials to have participated in programs designed to meet their special needs (i.e., programs for the educationally or physically handicapped, or special education programs in general); while substantially higher percentages reported having participated in remedial courses. It should be noted, however, that not all children with disabilities need special school services; for example, a child with a purely physical disability who receives the proper medical services for that disability may not require special school services. Under the IDEA, the term "children with disabilities" refers to children who have been evaluated and found to have a disabling condition that causes them to need special education services; however, many children with impairments do not require special education services, although they may receive remedial education services, accommodations, or other specialized services or instruction. Furthermore, for those students identified as disabled by their teachers in NELS:88, the linking of disability status to classroom performance may have caused many students to be identified as disabled who were, in fact, merely performing poorly on academic tasks.

These data actually raise more questions than they answer about the services students with disabilities are receiving in the nation's high schools: What is the nature and quality of the services students with special needs are receiving—whether or not the students correctly identify these services? Are these services—whether "remedial" or "special education"—adequately meeting these students' needs? Do the low levels of self-reported participation in special education programs, in fact, reflect a high level of underserved students with disabilities, or rather an increased inclusion of students with disabilities into general education programs, or merely the perceptions and misperceptions of students regarding the services they actually received at some time during high school?

Chapter 5
Educational Outcomes of Students with Disabilities

Overview

In this chapter, we examine the educational outcomes of students identified by parents, teachers, and others as disabled. Three major outcome areas are highlighted: (1) academic performance (i.e., grades in selected areas and proficiency in mathematics and reading), (2) educational expectations (i.e., highest expected education level), and (3) high school dropout rates. The tables that are presented highlight data from the NELS:88 second follow-up survey, conducted in 1992. The sample remains the cohort of 8th-graders who completed all three NELS:88 surveys (base year, first and second follow-ups), including graduates and dropouts of this original cohort. Following the approach used in the previous chapters, this chapter compares educational outcomes between populations of students with and without disabilities as a whole, across these populations as identified by different sources, and across specific disability categories.

Academic Performance

Academic performance is a fundamental outcome indicator of schooling. Of particular interest to this report is how students identified as having disabilities—overall and by specific disability category—compared in achievement to students without disabilities. As data from HS&B and the NLTS have indicated, students perceived to have disabilities might be expected to demonstrate lower academic performance than their nondisabled counterparts. As described below, data from NELS:88 show similar findings.

Average Grades in English, Mathematics, and Science

Table 5.1 presents an overview of the average grades during students' last year in high school in three basic areas of the curriculum. (The averages that are shown are based on a 1-to-13 point scale, where 1 = A+ and 13 = F.) Generally in all three subject areas, students identified as disabled by either parents or teachers earned lower grades (i.e., higher scores on the 13-point scale) than nondisabled students. For those identified with any disability by teachers, for example, the averages for each subject (English 8.48, mathematics 8.88, and science 8.80) were lower than those for students not identified as disabled (English 6.54, mathematics 7.22, and science 6.92). In general, the finding of lower grades for disabled students is consistent with earlier findings based on the HS&B population, where self-reported

grades of students identified as disabled by teachers and/or students themselves were significantly lower than those of nondisabled students (Owings and Stocking 1985).

Among the specific disability conditions described in table 5.1, only students with health or physical problems as identified by parents reported grade averages close to those of nondisabled students. For all other disability categories, students perceived to have disabilities earned lower grades than did their nondisabled counterparts.

Table 5.1— Average high school grade in English, mathematics, and science of students with disabilities (NELS:88 Second Follow-up Transcript Component), as identified by parents and teachers[a]

Source of Disability Information	Parent Base Year			Teacher First Follow-up		
Variable	English	Mathematics	Science[b]	English	Mathematics	Science[b]
Disability status						
Not identified	7.09	7.63	7.43	6.54	7.22	6.92
Identified	8.13	8.37	8.32	8.48	8.88	8.80
Multiple problems	8.45	8.27	8.70	8.93	9.18	9.22
Learning disabled	8.45	8.51	8.60	8.72	9.10	9.04
Health problem	7.95	8.07	8.06	7.95	8.45	8.40
Physical/emotional problem	7.94	8.26	8.25	8.83	9.11	9.09
Physical disability	7.24	7.98	7.89	--	--	--
Emotional problem	8.55	8.67	8.92	--	--	--
Sensory disability	7.80	8.12	8.08	--	--	--

(--) Not available.

(a) Data represent the eighth-grade panel population; percentages are derived using the 8th-12th grade transcript panel weight (F2TRP1WT).

(b) Grade is based upon a 1-13 scale, where 1.0 = A+ and 13 = F.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Transcript Component.

Proficiency in Mathematics and Reading

Tables 5.2 and 5.3 report students' proficiency levels in math and reading, respectively. The proficiency measures shown are based upon standardized cognitive tests administered to all NELS:88 student participants in 1988, 1990, and 1992.[23] Like the findings reported for cognitive test scores in HS&B (Owings and Stocking 1985), the math proficiency levels

[23] Multiple-choice cognitive tests were administered in four areas: reading comprehension, mathematics, science, and history/citizenship/geography. Groups of test questions that were identified as being similar in content and difficulty reflected specific proficiency levels. Students achieved a specific proficiency level if they correctly answered at least three of the four questions within a proficiency level. Students at particular skill levels were assumed to have mastered the lower skill levels; likewise, students were assumed not to have mastered higher skill levels. Only students with complete and consistent response patterns were assigned proficiency levels.

indicate a consistent negative relationship between disability status and level of proficiency (table 5.2). Whether identified by parents or teachers, disabled students were more likely to perform below level 1 or at levels 1 or 2 than were nondisabled students. This same pattern of lower performance for disabled students was also found for proficiency in reading (table 5.3).

Of particular note in both tables 5.2 and 5.3 are the generally lower performance levels in reading and mathematics achieved by students identified as having learning disabilities or multiple problems. In mathematics, between 58.2 and 61.1 percent tested below level 1 or at level 1 (out of five levels). In reading, between 58.3 and 71.3 percent of these students tested below level 1 or at level 1 (out of three proficiency levels). In contrast, and consistent with findings reported earlier, students identified by either parents or teachers as having health problems scored at about the same proficiency levels in mathematics and in reading (for those identified by parents only) as did nondisabled students generally.

Table 5.4 shows the changes in the estimated numbers of correct responses on reading and mathematics tests from the NELS:88 base year to the second follow-up survey. Although differences in these gain scores for disabled and nondisabled students may certainly be attributed to factors highly correlated with, but other than, disability conditions, they nevertheless provide insights into the important area of educational development. For students identified as disabled by parents, gains in mathematics proficiency fell short of those made by nondisabled students. At the same time, the gains in reading made by these disabled students were comparable to those made by nondisabled students over the same period. Comparing specific disability categories identified by parents to not identified students, LD students in particular evidenced lower gains in both reading and mathematics, from 1988 to 1992. In contrast, HP students performed about the same as not identified students.

A pattern of more pronounced differences in gain scores between disabled and nondisabled students emerges for students perceived by their teachers to be disabled. For reading, test-score gains were generally smaller for most teacher-identified categories of disability than were the gains for nondisabled students. For example, those identified as LD showed an average increase of 3.94 in reading from 1988 to 1992 compared to 5.86 for the nondisabled group. For mathematics, the gains of nondisabled students outpaced those made by teacher-identified disabled students in any of the disability categories shown in the table. In this case for example, LD student gains over the 4-year period were less than two-thirds those of nondisabled students.

Table 5.2— Percentage of students with disabilities, as identified by parents and teachers, who achieved various levels of twelfth-grade proficiency in mathematics (NELS:88 Second Follow-up Student Survey)[a]

Source of Disability Information	Parent Base Year						Teacher First Follow-up					
Variable	Math proficiency at 2nd Follow-up						Math proficiency at 2nd Follow-up					
	Below Level 1	Level 1	Level 2	Level 3	Level 4	Level 5	Below Level 1	Level 1	Level 2	Level 3	Level 4	Level 5
Disability status[b]												
Not identified	6.5	20.8	14.4	24.2	30.0	4.1	4.3	17.0	14.3	25.9	33.5	5.0
Identified	14.9	33.3	17.9	17.2	13.4	3.3	13.4	34.4	14.2	20.2	16.2	1.5
Multiple problems	19.9	38.1	15.7	15.9	9.9	0.5	18.3	39.9	15.0	14.5	11.9	0.6
Learning disabled	22.9	38.2	17.6	15.1	5.7	0.4	20.3	38.9	14.4	16.9	9.1	0.3
Health problem	7.2	27.1	16.2	20.0	20.7	8.7	8.4	31.1	14.7	22.8	20.9	2.2
Physical/emotional problem	12.1	32.0	16.3	18.8	17.0	3.8	12.7	35.0	15.5	17.9	17.1	1.8
Physical disability	16.2	29.1	12.9	18.2	15.1	8.6	--	--	--	--	--	--
Emotional problem	11.7	41.6	9.9	26.4	8.6	1.8	--	--	--	--	--	--
Sensory disability	11.9	32.2	19.6	13.0	20.8	2.5	--	--	--	--	--	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Student Survey.

Table 5.3— Percentage of students with disabilities, as identified by parents and teachers, who achieved various levels of proficiency in reading (NELS:88 Second Follow-up Student Survey)[a]

Source of Disability Information		Parent Base Year				Teacher First Follow-up			
Variable		Reading proficiency at 2nd Follow-up				Reading proficiency at 2nd Follow-up			
		Below Level 1	Level 1	Level 2	Level 3	Below Level 1	Level 1	Level 2	Level 3
Disability status [b]									
Not identified		6.8	30.6	39.6	22.9	5.6	28.3	41.2	24.9
Identified		17.0	39.4	31.4	12.2	13.9	39.7	32.6	13.7
Multiple problems	19.2	51.4	25.1	4.3	16.8	41.5	32.8	8.8	
Learning disabled		25.9	45.4	24.5	4.2	22.8	45.2	23.3	8.7
Health problem		7.2	31.8	43.7	17.3	8.8	32.6	40.7	17.9
Physical/emotional problem		12.3	39.8	31.6	16.3	12.8	40.0	33.8	13.4
Physical disability		11.2	35.0	31.8	22.0	--	--	--	--
Emotional problem		5.4	53.8	28.2	12.5	--	--	--	--
Sensory disability		16.4	36.9	32.7	14.0	--	--	--	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Student Survey.

Taken together, these data for teacher-identified disabled students suggest that the differences in proficiency by disabled and nondisabled students observed in table 5.3 cannot be attributed entirely to initial differences between these students when they entered high school. Rather, the disparities in reading and mathematics test-score gains for disabled and nondisabled students may also be related to (1) the fewer units of mathematics and English accumulated by the disabled group; (2) the greater likelihood of these students being assigned to high school remedial English and mathematics programs, as was observed in the previous chapter; and (3) the fact that teachers' disability identifications are directly linked to students' classroom performance.

Table 5.4— Gains in IRT-estimated number right for reading and mathematics tests,[a] Base Year to Second Follow-up, among students with disabilities (NELS:88 Base-Year and Second Follow-up Student Surveys), as identified by parents and teachers[b]

Source of Disability Information	Parent Base Year		Teacher First Follow-up	
Variable	Change in reading: Base Year to 2nd Follow-up	Change in mathematics: Base Year to 2nd Follow-up	Change in reading: Base Year to 2nd Follow-up	Change in mathematics: Base Year to 2nd Follow-up
Disability status [c]				
Not identified	5.65	11.75	5.86	12.45
Identified	4.92	9.98	4.80	9.38
Multiple problems	4.55	8.85	4.51	7.97
Learning disabled	4.16	8.72	3.94	8.34
Health problem	6.24	11.86	5.48	10.09
Physical/emotional problem	5.34	10.58	5.16	9.23
Physical disability	5.50	12.22	--	--
Emotional problem	6.44	10.63	--	--
Sensory disability	4.73	9.73	--	--

(--) Not available.

(a) "IRT-estimated number right" refers to test scores adjusted for individuals' patterns of responses to test items. "IRT" is Item Response Theory.

(b) Data represent the eighth-grade panel population.

(c) Percentage represents the distribution within each disability status.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Student Survey.

Educational Expectations

Course-taking patterns and academic performance during high school can be expected to reflect and influence educational expectations following high school graduation. Given the differences so far observed between the high school experiences and performance of disabled and nondisabled students in NELS:88, we might expect to find differences among those students with respect to their educational expectations. In this section, we consider two different indicators of these expectations: students' and parents' estimates of eventual educational attainments and students' taking of college entrance examinations.

Expectations for Highest Education Level

At the NELS:88 second follow-up, both students and their parents were asked to indicate how much schooling they expected the students to attain. For students identified as disabled by parents, the educational expectations of both students and their parents were slightly lower than the expectations for the nondisabled students (table 5.5). The educational expectations of students identified as disabled by teachers also were lower than the expectations of

nondisabled students. Similarly, the parents of these teacher-identified disabled students had lower expectations for their sons and daughters than did the parents of nondisabled students.

Taking parent-identified LD students as an example, slightly more than 30 percent of students had parents that expected them to attain less than a B.A. degree; for nondisabled students, fewer than 25 percent of their parents had set their expectations this low. For teacher-identified LD students, 12.5 percent of these students expected only to complete high school or less, compared to only 4.3 percent of the nondisabled group. Furthermore, more teacher-identified LD students had lower educational expectations than did the disabled group overall (12.5 percent versus 11.1 percent).

Despite the pattern of lower educational expectations among disabled students, it is important to note that many of these students did aspire to college and beyond. For example, almost 50 percent of the students identified as learning disabled by their parents or teachers in 1992 expected to obtain at least 4 years of college education. The parents of these students were even more optimistic; more than 60 percent of the parents of teacher- or parent-identified LD students expected their sons and daughters to complete 4 or more years of college in 1992.

Table 5.5— Percentage of students with disabilities, as identified by parents and teachers, who held or whose parents held various levels of educational expectations (NELS:88 Second Follow-up Student and Parent Surveys)[a]

Source of Disability Information	Parent Base Year								Teacher First Follow-up							
Variable	Student's expectations				Parent's expectations[b]				Student's expectations				Parent's expectations			
	HS or less	Some college	4 yr BA	Post-BA	HS or less	Some college	4 yr BA	Post-BA	HS or less	Some college	4 yr BA	Post-BA	HS or less	Some college	4 yr BA	Post-BA
Disability status[c]																
Not identified	5.8	24.7	33.2	36.6	3.9	16.8	42.3	37.0	4.3	23.0	35.5	37.2	3.2	15.2	43.3	38.3
Identified	9.8	31.5	29.3	29.4	7.7	18.7	37.8	35.8	11.1	35.3	23.1	30.7	7.4	24.5	35.9	32.2
Multiple problems	13.6	33.5	22.4	30.5	6.0	25.7	29.3	39.0	16.4	33.8	20.2	29.6	9.1	24.8	35.4	30.7
Learning disabled	13.2	37.1	22.5	27.2	10.1	23.5	36.5	29.9	12.5	40.6	19.2	27.6	9.3	27.9	36.5	26.3
Health problems	8.2	27.0	37.7	27.0	8.4	16.4	40.0	34.7	11.0	26.1	27.2	35.7	5.8	19.3	37.8	37.0
Physical/emotional problem	8.9	27.2	30.7	33.2	4.9	15.6	36.5	41.8	12.2	35.5	23.0	29.3	8.8	23.9	33.1	34.2
Physical disability	8.8	26.2	29.2	35.9	6.2	16.4	35.4	42.0	--	--	--	--	--	--	--	--
Emotional problem	9.2	30.2	21.5	32.0	4.7	13.0	35.6	46.8	--	--	--	--	--	--	--	--
Sensory disability	8.5	27.8	35.7	28.0	4.2	19.5	36.9	39.4	--	--	--	--	--	--	--	--

(--) Not available.
(a) Data represent the eighth grade panel population.
(b) Data from the Parent Survey are weighted using the Second Follow-up panel weight (F2PNLWT).
(c) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Student and Parent Surveys.

Completion of Scholastic Aptitude Test (SAT) and American College Testing (ACT) Program

NELS:88 provides an additional indicator of students' expectations related to higher education—students' reports of completion or of their intention to take the SAT or ACT during the current academic year. This indicator reveals differences between disabled and nondisabled students (table 5.6). For example, while almost one-half of the nondisabled students had taken or reported that they intended to take the SAT exam, 39.2 percent of the disabled students identified by parents and 30.1 percent of those students identified by teachers reported they had done so or planned to take the exam. For those students identified by teachers, students in each of the disability categories less frequently reported having taken or made plans to take the SAT exam than did nondisabled students. Even those students identified by teachers as having health problems were less likely than nondisabled students to have completed or planned for this exam.

In contrast, students perceived by their parents to be disabled were more similar to nondisabled students when it came to completing or planning for the SAT. Parent-identified students in most of the disability categories reported a similar status to nondisabled students with respect to the SAT except for students with learning problems. Parent-identified LD students less often reported that they had completed or intended to complete the SAT.

The results for the ACT generally follow the same patterns as for the SAT, especially for those students identified by teachers. Parent-identified students with disabilities generally evidenced lower levels of higher education preparation using the ACT indicator than with the SAT indicator. Across all disability groups except for health problems, and for both the SAT and ACT, disabled students were less prepared testwise for higher education than were nondisabled students.

Table 5.6— Percentage of students with disabilities, as identified by parents and teachers, who reported that they had completed or intended to complete the Scholastic Assessment Test (SAT) or the American College Test (ACT) (NELS:88 Second Follow-up Student Survey)[a]

Source of Disability Information	Parent Base Year		Teacher First Follow-up	
Variable	SAT *% completed or intended this year*	ACT *% completed or intended this year*	SAT *% completed or intended this year*	ACT *% completed or intended this year*
Disability status [b]				
Not identified	47.9	41.3	49.7	42.5
Identified	39.2	34.9	30.1	29.3
Multiple problems	45.5	26.8	24.2	23.4
Learning disabled	30.1	31.7	25.9	22.6
Health problem	50.4	38.8	36.2	35.8
Physical/emotional problem	45.7	34.2	27.9	29.7
Physical disability	51.1	37.1	--	--
Emotional problem	39.8	22.6	--	--
Sensory disability	46.3	37.2	--	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Student Survey.

Dropout Rate

Another important and often-reported indicator of educational outcomes is school disengagement, typically represented by dropout behavior. Table 5.7 shows the percentages of students identified by parents and teachers as disabled who dropped out of high school (i.e., since March of their ninth-grade year) as reported in the second follow-up survey. In reviewing this table, it is important to note that the lower dropout rates for students identified by teachers may be explained by the particular teacher definition of disability/nondisability status used in this report. Specifically, students had to be enrolled in tenth grade (i.e., at the NELS:88 first follow-up) to be classified under this definition. Since teachers identified students with disabilities in the tenth grade, the dropout measure for those students effectively covers grades 10-12 only. Since parents identified students with disabilities in the eighth grade, the dropout measure for these students covers grades 9-12.

Table 5.7— Percentage of students with disabilities, as identified by parents and teachers, who dropped out of high school (NELS:88 Second Follow-up Student Survey)[a]

Source of Disability Information	Parent Base Year	Teacher First Follow-up
Variable	% ever dropped out [b] since March 1989 at 2nd follow-up	% ever dropped out [b] since March 1989 at 2nd follow-up
Disability status [c]		
Not identified	14.8	6.2 [d]
Identified	26.8	19.5
Multiple problems	34.1	26.0
Learning disabled	26.0	16.5
Health problem	28.5	16.8
Physical/emotional problem	29.5	23.8
Physical disability	27.6	--
Emotional problem	49.9	--
Sensory disability	18.3	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) "Ever dropped out" is based on the variable F2EVDOST, which indicates whether or not the sample member ever dropped out in the first follow-up or second follow-up survey. The variable is based on a sample member's dropout history since the beginning of the first follow-up in March 1989.
(c) Percentage represents the distribution within each disability status.
(d) The dropout percentages for teacher-identified disabled and nondisabled students do not include students who had dropped out between the ninth and tenth grades (i.e., between spring 1989 and spring 1990).

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, First and Second Follow-up Student Surveys.

About one-quarter of the students identified as disabled by parents and almost one-fifth of the students identified as disabled by teachers reportedly dropped out of high school during this period. The dropout rates for students under each disability definition were much higher than those for the respective populations of nondisabled students, who reportedly dropped out at rates ranging from 6.2 to 14.8 percent. The dropout rates were high for every disability category, particularly for students identified by parents as having emotional problems (49.9 percent).

Outcomes for Students Who Report Themselves to be Disabled

This section compares several key educational outcomes of students who identified themselves as disabled to those who did not. The patterns of average grades in the three core curriculum areas and dropout rates for these self-identified students are similar to those observed in tables 5.1 and 5.7 for students identified as disabled by their parents or teachers (table 5.8). In contrast to parent- or teacher-identified disabled students, however, self-identified students with disabilities in NELS:88 had lower grades than did nondisabled students only in English; their grades in mathematics and science were comparable to those of nondisabled students. These self-identified disabled students had higher dropout rates than nondisabled students.

The comparative proficiency levels in mathematics and reading of students who identified themselves as disabled also were lower than for nondisabled students (tables 5.9 and 5.10).

Table 5.8— Average high school grade in English, mathematics, and science and percentage of students who identified themselves as disabled who dropped out of high school (NELS:88 Second Follow-up and Second Follow-up Transcript Component)[a]

Source of Disability Information	Student-Identified Disability at First Follow-up			
Variable	English	Mathematics	Science [b]	Percent ever dropped out since March 1989 at 2nd Follow-up
Disability status [c]				
Not identified	7.06	7.63	7.38	10.9
Identified	7.89	7.73	7.92	18.4

(a) Data represent the eighth-grade panel population.
(b) Grade is based upon a 1-13 scale, where 1.0 = A+ and 13 = F.
(c) Percentage represents the distribution within each disability status; percentages are derived using the 8th-12th grade transcript panel weight (F2TRP1WT).

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); First Follow-up Student Survey, Second Follow-up Student Survey, and Second Follow-up Transcript Component.

Table 5.9— Percentage of students who identified themselves as disabled, who achieved various levels of proficiency in mathematics (NELS:88 Second Follow-up Student Survey)[a]

Source of Information	Student-Identified Disability at First Follow-up					
	% in each level of proficiency					
Variable	Below Level 1	1	2	3	4	5
Disability status [b]						
Not identified	6.3	21.0	14.7	24.3	29.5	4.2
Identified	10.7	37.6	15.2	24.3	11.0	1.1

(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); First Follow-up Student Survey, Second Follow-up Student Survey.

Table 5.10— Percentage of students who identified themselves as disabled, who achieved various levels of proficiency in reading (NELS:88 Second Follow-up Student Survey)[a]

Source of Disability Information	Student-Identified Disability at First Follow-up			
	% in each level of proficiency			
Variable	Below Level 1	1	2	3
Disability status [b]				
Not identified	7.4	31.0	38.7	22.9
Identified	17.3	40.3	35.4	7.0

(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); First Follow-up Student Survey, Second Follow-up Student Survey.

Summary

It is clear from the results presented in this chapter that disability status is associated with less positive educational outcomes. Whether identified by teachers or parents, or by their reported participation in special education programs, students perceived to have disabilities recorded lower grades, lower scores on proficiency tests and lower gains in these test scores over time, and lower educational expectations beyond high school than did nondisabled students. The percentages of disabled students who dropped out during high school were almost twice to three times the percentages for nondisabled students. Given this overall pattern of findings, it remains important to identify differences in the outcomes achieved by students with different disabling conditions. For example, for many of the performance outcomes reviewed, students with health problems (as identified by parents or by teachers) were similar to nondisabled students. In contrast, students identified as having multiple disabilities and those with learning disabilities often recorded the lowest performance levels (e.g., as indicated by proficiency in mathematics or reading or by lower educational aspirations). Finally, students identified by their parents as having emotional problems recorded the lowest grades and the highest levels of school dropout. Taken together, these findings suggest different sets of problems and the need for different responses from schools to ameliorate them.

Chapter 6
Summary and Conclusions

For this report, several different definitions of disability status were developed based on NELS:88 survey information collected from parents, teachers, students, and school officials. Despite the lack of overlap across the populations of students identified in each of these ways, the patterns of difference between the various disabled and nondisabled student groups were similar to one another in many respects and were consistent with findings from previous studies (e.g., High School and Beyond and the National Transition Longitudinal Study). When identification of disability status was based on teachers' reports, the differences between disabled and nondisabled students were more extensive. These findings are reviewed below and are followed by a brief discussion of three general observations based on this work.

Characteristics of Populations Identified as Disabled by Both Parents and Teachers

Students who identified themselves as disabled or were so identified by their teachers or their parents more often were male, had lower scores on locus of control psychological measures, took more remedial courses in high school, earned lower high school grades in core courses, scored lower on proficiency tests, and had higher dropout rates than their nondisabled counterparts. For each of the disabled populations defined by these NELS:88 respondents, there was no evidence of the overrepresentation of minorities; however, black students were overrepresented and underrepresented, respectively, in the teacher-identified and parent-identified learning disabled populations (compared to their distributions within the respective nondisabled populations). Findings for participation in remedial mathematics and reading programs mirrored those for students who had been excused from the base-year survey by school officials for reasons of mental disability; students perceived to have disabilities were more likely to participate in these courses than were others.

Teacher- or parent-identified disabled students more often were older than others in their grades and more often had repeated a grade prior to the eighth grade (hence the tendency for them to be older) than nondisabled students. Teacher- or parent-identified disabled students were more likely to report having been in special education classes, had earned fewer units in core curriculum areas, and evidenced lower rates of gains on mathematics proficiency tests. These students reported lower educational expectations, for themselves and for them by their parents, and they were less prepared for higher education than their nondisabled counterparts by virtue of not having taken or planned to take either the SAT or ACT. The urbanicity and socioeconomic status (SES) of the school as a whole did not seem to be related to teacher and parent perceptions of disability status.

Characteristics of Populations Identified as Disabled Only by Teachers, Not by Parents

Teacher-identified disabled students were more likely to have lower individual SES, lower self-esteem, and to have participated to a lesser extent in extracurricular activities than their nondisabled counterparts. In these respects, teacher-identified disabled students differed from either parent-identified or self-identified disabled students. In addition, teacher-identified disabled students were more likely to come from households headed by single females, to have participated in a dropout prevention program in high school, and to have evidenced lower rates of gain on reading proficiency tests than nondisabled students. In these ways, they also differed from parent-identified disabled students. With respect to participation in dropout prevention programs, the participation rates of these teacher-identified students approached those of the BYI students who were excused from the base-year NELS:88 survey on the basis of mental disability but who returned to the sample in the first or second follow-up.

General Observations

Across the various NELS:88 respondent-identified populations of students with disabilities, there is clear evidence that students with disabilities tended to have greater difficulties in school and realized fewer of the positive outcomes of schooling.

Students with disabilities as identified in NELS:88 were more often retained in grade, enrolled in remedial classes, and placed in dropout prevention programs. Perhaps as a result, they earned fewer credits in core curriculum areas, had lower educational expectations, and had higher dropout rates than nondisabled students on average. Given this general pattern of less positive experiences for disabled students, the severity of these sorts of education-related problems for disabled students did appear to vary by type of disabling condition. Throughout the chapters in this report, the distinctive needs and problems of learning disabled students and of students with multiple handicaps were noted. Students with emotional problems were also shown to have among the highest dropout rates, while students with physical problems were most similar to nondisabled students in overall grade averages. Students with health problems compared most favorably with nondisabled students with respect to several types of outcomes. For these reasons, when the school experiences and outcomes of disabled students are examined, it continues to be important to collect information and carry out analyses separately for various specific disability categories.

Relatively small percentages of students with disabilities perceived themselves or were identified by school officials to have received special education services during high school.

Overall, fewer than one-tenth of those students identified by parents or teachers as disabled reported ever having participated in a program for the educationally or physically handicapped during high school. School officials reported higher, but still relatively low, participation rates for these students in special education programs during high school. As discussed in chapter 4, these low reported participation rates may raise questions concerning the adequacy with which students with special needs are identified and served in our nation's high schools, and the extent to which these students are being served in more inclusive environments that might affect their awareness of being in a "special" program. It should be noted, however, that the NELS:88 base-year sample likely excluded many children with disabilities who are served

under the Individuals with Disabilities Education Act (IDEA). Similarly, NELS:88 parent and teacher survey items related to disability status may have led to the identification of many students who would not be considered disabled under the IDEA.

Teachers in NELS:88 were perceptive judges of which students were failing to perform well in the classroom, but linking the identification of disability status to classroom performance may blur the distinction between students with disabilities and students at risk.

In NELS:88, teacher perceptions of disability status were linked to students' classroom performance—i.e., teachers identified students as disabled only if their condition affected their school work. Nevertheless, teacher reports of students' disability status often "overlapped" the reports made by different NELS:88 respondents. For example, more than 70 percent of the students identified by school officials as having participated in special education in high school were also (and independently) identified as disabled by teachers. In addition, more than one-half of all students who reported their own participation in special high school classes for the educationally or physically handicapped were also identified as disabled by teachers, and almost one-half of the students identified as disabled by parents were so identified. At the same time, as summarized above, the students identified by teachers as disabled (in contrast to those identified by parents) also were found to have more of the sorts of personal characteristics, educational experiences, and records of achievement one might generally associate with students at risk of educational failure (e.g., lower SES, higher participation in dropout prevention programs, lower gains in reading proficiency). For this reason, in the future, it will be important for survey research efforts to separate teachers' perceptions of disability status from students' classroom performance. That is, although this form of identification allows us to benefit from teachers' perceptions of which children are performing poorly, as a method of identification for disability status, it may (1) include children who are performing poorly in the classroom but who are not necessarily disabled, or (2) exclude children who are disabled but whose school work is not affected by their disability.

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Appendix A
NELS:88 Indicators of Disability and Comparisons with Other National Data Sets

Since the passage of the Education for All Handicapped Children Act of 1975, now called the Individuals with Disabilities Education Act (IDEA), efforts have been made to estimate the numbers of students with disabilities in the population. These efforts have involved the use of data compiled by the U.S. Department of Education, Office of Special Education Programs (OSEP), as well as various surveys and national studies. For example, the Current Population Survey (CPS), the National Health Interview Survey on Child Health (NHIS/CH), High School and Beyond (HS&B), and the National Education Longitudinal Study of 1988 (NELS:88) have all been used to provide these estimates. In addition, the National Longitudinal Transition Study of Special Education Students (NLTS), begun in 1987, was commissioned to describe the characteristics and experiences of students with disabilities.

Across these varied data collection efforts, the criteria used to identify students with disabilities have been varied, ambiguous, and inconsistent. Because definitions of disability are often subjective, prevalence estimates based on one definition may differ substantially from estimates using another definition. *This appendix supplements the discussion of chapter 2 by providing a listing of the actual indicators in NELS:88 related to disability status and disability-related services received. It then compares estimates based on NELS:88 and other sources of the prevalence of students with disabilities in the general population and estimates of the distribution of disabled students among various special education service categories.*

NELS:88 Indicators of Disability Status and Services Received

Table A.1 summarizes the *primary* indicators of disability status and disability-related services received, used in the NELS:88 Base-Year, First, and Second Follow-up Surveys (Parent, Student, and Teacher Questionnaires) and available from transcript data collected during the Second Follow-up.[1] Table A.2 compares these NELS items with items used in HS&B to indicate disability status, and with the disability categories used for federal eligibility determination and for sampling by the NLTS. Like HS&B, NELS:88 was designed to survey

[1] The primary indicators presented in table A.1 reflect those items in NELS:88 that are most directly related to disability status and disability-related services and therefore of key relevance to this report. The NELS:88 data set includes other indicators that may also be related to disability status and services (e.g., academic/learning problems, enrollment in at-risk/remedial programs, discipline/attendance problems). Many of these indicators are used as dependent variables in this report.

broadly the education-related experiences of American youth; it was not designed to address specific issues related to the population of students with disabilities in depth. Nevertheless, the NELS:88 dataset is an important resource for describing this population because of its nationally representative samples of middle and high school students, its long period of coverage, its extensive and varied data collections, and the possibility of replicated data collections in the future.

Table A.1— Primary indicators of disability in NELS:88 (variable name and items)

	Baseline	Follow-up 1	Follow-up 2
Parent	BYP47. In your opinion, does your 8th-grader have any of the following problems? a. Visual handicap (not correctable by glasses) b. Hearing problem c. Deafness d. Speech problem e. Orthopedic problem (for example: club foot, absence of arm or leg, cerebral palsy, amputation, polio) f. Other physical disability g. Specific learning problem (for example: dyslexia or other reading, spelling, writing, or math disability) h. Emotional problem i. Mental retardation j. Other health problem BYP48. Has your 8th-grader ever received special services for any or all of the following? (10 problems specified-same as item 47) BYP49. Is your 8th-grader currently enrolled in any of the following special programs/services? c. Special services for orthopedically handicapped students d. Special education services for students with learning disabilities	No items	No items
Student	No items	F1S34. Have you ever been in any of the following kinds of courses or programs in high school? f. Special program for the educationally handicapped g. Special program for the physically handicapped F1S99h. I became seriously ill or disabled (in the last 2 years)	F2S12A. Which of the following best describes your present high school program? e. Special Education Program F2S13. Have you ever been in any of the following kinds of courses or programs in high school? f. Special program for the educationally handicapped g. Special program for the physically handicapped F2S96. I became seriously ill or disabled (in the last 2 years)
Teacher	BYT_9. Has this student ever fallen behind in school work because of a health problem? BYT_10. Currently, has this student a physical or emotional handicap that is affecting his or her school work?	F1T1_8. Has this student fallen behind in school work because of a health problem? F1T1_9. Do you feel this student has a learning disability that affects his or her school work? F1T1_10. Do you feel this student has a physical or emotional handicap that affects his or her school work?	No items
Transcript			F2RSPFLG. Has student participated in any [special education, bilingual education, or gifted] programs?

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year, First, and Second Follow-up Surveys.

Table A.2— Comparison of disability indicators in NELS:88 and High School and Beyond (HS&B) with federal disability categories and NLTS

NELS:88	HS&B:80	HS&B:82	Federal Disability Categories and NLTS**
Transcript Data **F2RSPFLG**- Student has participated in any [special education, bilingual education, or gifted] programs.			
Parent Items In your opinion, does your eighth grader have any of the following problems? **(BYP47)** Visual handicap (not correctable by glasses) Hearing problem Deafness Speech problem Orthopedic problem (for example: club foot, absence of arm or leg, cerebral palsy, amputation, polio) Other physical disability Specific learning problem (for example: dyslexia or other reading, spelling, writing, or math disability) Emotional problem Mental retardation Other health problem Has your 8th-grader ever received special services for any or all of the following? (10 problems specified--same as item BYP47) **(BYP48)** Is your 8th-grader currently enrolled in one of the following special programs/services? c. Special services for orthopedically handicapped students **(BYP49c)** d. Special education services for students with learning disabilities **(BYP49d)**	**Student Items** Do you have any of the following conditions? Visual handicap* Hard of hearing Deafness Speech disability Orthopedic handicap Specific learning disability Other health impairment*	**Student Items** Do you have any of the following conditions? Visual handicap (not correctable by glasses) Hard of hearing Deafness Speech disability Orthopedic handicap Other physical disability or handicap Specific learning disability None of these conditions	Visual impairment or blindness Hearing impairment Deafness Speech or language impairment Orthopedic impairment Other health impairment Specific learning disability Mental retardation Serious emotional disturbance Deaf-Blindness Autism Traumatic brain injury Multiple disabilities

(Continued)

* These categories were not used to define disability status in analysis of HS&B data.

** The National Longitudinal Transition Study of Special Education Students (NLTS), begun in 1987, sampled special education students from within 11 of the 13 current federal disability categories. It did not use Autism or Traumatic Brain Injury, which were added in 1990.

Table A.2— **Comparison of disability indicators in NELS:88 and High School and Beyond (HS&B) with federal disability categories and NLTS (continued)**

NELS:88	HS&B:80	HS&B:82	Federal Reporting Categories and NLTS
Student Items			
Have you ever been in any of the following kinds of courses or programs in high school?	Have you ever been in a [see below] in high school/ in your junior or senior year?	Have you ever been in a [see below] in high school/ in your junior or senior year?	
Special program for the educationally handicapped **(F1S34f/F2S13f)**			
Special program for the physically handicapped **(F1S34f/F2S13g)**	[special program for the physically handicapped]	[special program for the physically handicapped]	
Which of the following best describes your present high school program? e. Special Education Program **(F2S12Ae)**			
I became seriously ill or disabled (in the last 2 years). **(F1S99h/ F2S96)**			
Teacher Items	**Teacher Items *****	**Teacher Items *****	
[Student] currently has a physical or emotional handicap that is affecting his or her school work? **(BYT10)**	[Student] had or may have had a physical or emotional handicap that was affecting his or her school work.	[Student] had or may have had a physical or emotional handicap that was affecting his or her school work.	
Do you feel this student has a physical or emotional handicap that is affecting his or her school work? **(F1T10)**			
[Student has] ever fallen behind in school work because of a health problem? **(BYT9)** Has this student fallen behind in school work because of a health problem? **(F1T8)**			

*** In Owings and Stocking (1985), at least two or a majority of teacher respondents had to respond "Yes" for the students to be identified as disabled.

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Table A.2— Comparison of disability indicators in NELS:88 and High School and Beyond (HS&B) with federal disability categories and NLTS (continued)

NELS:88	HS&B:80	HS&B:82	Federal Reporting Categories and NLTS
Do you feel this student has a learning disability that is affecting his or her school work? **(F1T9)**			
	Do you feel that you have a physical condition that limits the kind or amount of work you can do on a job, or affects your chances for more education?	Do you feel that you have a physical condition that limits the kind or amount of work you can do on a job, or affects your chances for more education?	
	Do you plan to use funds from the Division of Vocational Rehabilitation Educational Benefits for further study beyond high school?	Do you plan to use funds from the Division of Vocational Rehabilitation Educational Benefits for further study beyond high school?	

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year, First, and Second Follow-up Surveys and HS&B 1980 and 1982 Student and Teacher Surveys, NCES, U.S. Department of Education; *Sixteenth Annual Report to Congress on the Implementation of the Individual with Disabilities Education Act* (1994), OSEP, U.S. Department of Education.

Estimates of the Numbers of Students with Disabilities

Keeping in mind that not all students with disabilities were included in the NELS:88 base-year sample, two types of estimates of the numbers of students with disabilities can be derived from NELS:88: (1) estimates of the proportion of students who have or are reported to have a disability at a specific point in time (i.e., prevalence estimates), and (2) estimates of the distribution of students with disabilities among the various special education service categories. Comparisons of each of these types of estimates derived from NELS:88 and from other data sources provide insight into the effects of alternative measurement strategies.

Prevalence Estimates of Students with Disabilities

Table A.3 presents national estimates of the prevalence of students with specific disabilities in the population, based on various national assessments, census counts, and surveys. The table notes summarize important variations in procedures across the data sets. For example, note 4 explains that the total NAEP estimate does not reflect the entire population of students with disabilities associated with the NAEP data collection; rather, it includes only those students excluded from NAEP on the basis of disability and does not include students with disabilities who participated in NAEP, since NAEP did not collect specific disability data on included students in 1988.

In comparing the prevalence estimates in table A.3, it is important to note the differences in the disability categories, the age ranges of the populations, and the data collection procedures and sources of information represented by each data set. As shown in table A.3, there is considerable variation across data sets in prevalence estimates overall and by specific disability. With the exception of NAEP as explained above, overall estimates range from a low of 8.0 percent for OSEP to a high of 23.5 percent for NHIS/CH. Estimates for specific learning disability (LD), the largest disability category with more than half of all students served under the IDEA (see table A.4), range from 1.7 percent in 1982 HS&B to 7.6 percent in NELS:88, reflecting parent reports of students who had ever received services for a specific learning disability. (The OSEP estimates, including an overall estimate of about 8 percent and an LD estimate of about 4 percent, might be considered a basis for comparison, since they are the only data that were collected specifically to provide counts of the numbers of students identified as eligible to receive special education services under the IDEA.) These variations underscore the difficulty of obtaining reliable and consistent disability prevalence estimates from data sets using different data collection procedures and definitions. The differences in estimates between NELS:88 and the other data sets also provide a context for understanding the definitions of disability status that are used in this report for describing populations of students with disabilities, using NELS:88.

TABLE A.3— Data sets on disability prevalence among children in the United States[1]

1988 NELS (eighth grade)[2]			HS & B (tenth grade)[3]			1988 NAEP (Age 13)[4]		1992 CPS (Age 5-17)		1988 NHIS/CH (Under Age 18)[5]		1994 OSEP (Age 6-21)[6]	
Classification (Parent report)	% with condition	% received services	Classification (Student report)	% 1980	% 1982	Classification	%	Classification	%	Classification	%	Classification	%
Mental retardation	0.1, [3.1][7]	0.0				Mentally retarded	1.0 [20.4]	Mental retardation	0.7	Delay in growth or development	4.0	Mental retardation	0.9
Specific learning problem	6.1	7.6	Specific learning disability	2.6	1.7	Learning disabled	2.1 [43.5]	Learning disability	4.3	Learning disability	6.5	Specific learning disability	4.1
Emotional problem	2.8	2.6				Emotionally disturbed	0.3 [6.1]	Serious emotional disturbance	0.9	Emotional or behavioral problem (age 3-17)	6.1	Serious emotional disturbance	0.7
Speech problem	1.6	6.9	Speech disability	1.6	1.1	Speech impaired	0.1 [1.3]	Speech impairment	2.5	Speech impairment	2.6	Speech or language impairment	1.7
Hearing problem	2.2	1.9	Hard of Hearing	2.2	1.8	Hard of hearing	0.0 [0.5]	Other hearing impairment	1.2	Deafness and hearing loss	1.5	Hearing impairment	0.1
Deafness	0.4	0.3	Deafness	0.4	0.5	Deaf	0.0 [0.2]	Deafness	0.4				
Visual handicap (not correctable with glasses)	1.6	1.1	Visual handicap[8]	1.6	1.5	Visual handicap/blind	0.0 [0.2]	Other visual impairment	1.8	Blindness and vision impairment	1.3	Visual impairment	<0.1
								Blindness	0.3				
						Deaf/blind	0.0 [0.1]					Deaf-blindness	0.0
Orthopedic problem	0.9	1.1	Orthopedic handicap	1.3	0.9	Orthopedically impaired	0.0 [0.7]	Orthopedic impairment	1.0	Musculoskeletal impairments	1.5	Orthopedic impairment	0.1
Other physical disability	1.1, 0.4[7]	0.8	Other health Impairment	2.0	2.6	Multidisabled	0.2 [3.2]	Other health impairment	1.9			Multiple impairment	0.2
Any other health problem	3.7	2.3				Other	0.3 [5.5]					Other health impaired[9]	0.1
Total	15.9	[10] 19.5[10]		11.7	10.1		4.0		15.0		23.5		8.0

Table A.3 - Notes

[1] Data sets include: National Education Longitudinal Study (NELS), 1988; High School and Beyond (HS&B), 1980 and 1982 sophomore cohort; National Assessment of Educational Progress (NAEP), 1988, 13 year-olds; Current Population Survey (CPS), 1992 October Supplement on School Enrollment; National Health Interview Survey on Child Health (NHIS/CH), 1988; Office of Special Education Programs (OSEP) State-reported data. Data and notes for NAEP, CPS, and NHIS/CH were abstracted from Westat, Inc. (1994).

[2] NELS:88 data are derived from the base-year parent survey as follows: Weighted percentages in first column (% with condition) are derived from variable BYP47; weighted percentages in the second column (% received services) are derived from variable BYP48. The unbracketed percentages in these columns include only those students who were included in the 1988 base-year parent survey. They do not include students who were judged ineligible to participate in the base-year survey (i.e., the base-year ineligible, or BYI, students described in the last section of this appendix). These students are shown in the bracketed percentages, as explained in note 7 below.

[3] HS & B data abstracted from Owings, J. and Stocking, C. (1985).

[4] Bracketed figure is the disability prevalence among the approximately 5 percent of students excluded from NAEP because of physical disability, mental disability, or language problem. Approximately 79 percent of excluded 13 years-olds had a disability; the remainder had only a language problem. The first, unbracketed, percentage figure is the number of excluded students with a disability as a percent of total students. (In 1988, NAEP collected no data on the specific disability categories of *included* students.)

[5] The first three items—Delay in growth and development, Learning disability, and Emotional or behavioral problem—include children who have ever had the condition (lifetime prevalence). Concerning the third, when two additional questions are included: Has the child ever been treated for any emotional, mental, or behavioral problem or ever had anyone suggest that the child needed such treatment, the rate increases to 13.4 percent. The remaining items come from the Child Health questionnaire for chronic conditions, and the rates are conditions per 100 persons rather than percent of persons. A person may have more than one condition per category, especially Musculoskeletal impairments, which consists of many subgroups; so the condition rate may exceed the number of separate individuals involved.

[6] Data from Table AA25 in the *Sixteenth Annual Report to Congress on the Implementation of the Individuals with Disabilities Education Act* (OSEP 1994). Data are based on counts of students, ages 6-21, served in special education programs under IDEA, Part B, and chapter 2 of ESEA (SOP/State Operated Programs), as a percentage of U.S. Census Bureau estimates of resident populations, by state, for July 1992. This excludes children and disabilities unrelated to special education needs as defined by the federal disability categories.

[7] The bracketed percentages for the categories Mental retardation and Other physical problem reflect the percent of students, in terms of the total population, who were judged to be ineligible to participate in the base-year NELS:88 survey on the basis of mental or physical disability (i.e., BYI sample).

[8] In the 1982 survey, "not correctable with glasses" was added to the definition.

[9] Other health impairments include Autism and Traumatic brain injury (categories added under IDEA in 1990).

[10] Each NELS:88 "total" is the total weighted percentage of students whose parents indicated they have one or more disability-related problems (first column) or have ever received services for one or more disability-related problems (second column). These percentages are smaller than the sums of the individual column percentages because parents attributed more than one disability-related problem to some students (i.e., adding the column percentages would have produced duplicated counts).

Estimates of the Distribution of Students with Disabilities

Table A.4 presents estimates of the distribution of students with specific disabilities among special education service categories. These estimates are derived from three sources: (1) OSEP's most recent estimates of students, ages 6-21, served in special education programs under IDEA, Part B, and ESEA, Chapter 1 (SOP) during the 1992-93 school year;[2] (2) data from the NLTS on secondary school students with disabilities; and (3) parent reports from the NELS:88 base-year survey regarding whether eighth-grade students had a specific disability-related problem(s) and whether they had ever received special services for the problem(s). As shown in table A.4, students with specific learning disabilities represent a large proportion of the total population with disabilities: More than half of the populations reported by OSEP and NLTS are learning disabled as are more than one-quarter of the students with disabilities in NELS:88.[3] The data also confirm that relatively small percentages of students fall within the disability categories that are generally considered to be "low incidence" categories (e.g., hearing impairments/deafness, visual impairments, deaf-blindness, other health impairments, orthopedic impairments). However, significant variations can be seen across the data sets, which may be attributed to different definitional criteria and data collection procedures. For example, the proportion of students with mental retardation (a relatively "high-incidence" category) is negligible in NELS:88 because the parent reports upon which these percentages are based did not include those students who were excused from participating in NELS:88 due to "mental disability" in the base year. In contrast, the proportion of students with multiple disabilities (a "low-incidence" category) in NELS:88 is disproportionately high because it includes all students whose parents indicated they had more than one disability-related problem or had ever received services for more than one problem.

The proportions of special education students with speech and language impairments also show variation across data sets (3.4 percent in NLTS to 21.7 percent in OSEP), probably due in part to the different age ranges of the populations and the fact that higher proportions of elementary school children have speech and language impairments and receive services for them than secondary school students do. (The OSEP data include students ranging in age from 6 to 21, while the NLTS and NELS:88 data include students 13 or more years of age.) Probably for similar age-related reasons, the speech and language impairment category includes a much higher proportion of eighth-grade students in NELS:88 whose parents report them to *have ever received services for "speech problems"* (24.4 percent) *than to currently have a "speech problem"* (5.6 percent). These varied estimates of the distribution of students with disabilities

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[2] Each year, the Office of Special Education Programs (OSEP), U.S. Department of Education, is required under P.L. 94-142 (IDEA) to collect, analyze, and report data to Congress to "assess the extent to which all students with disabilities are receiving a free, appropriate public education." According to OSEP's most recent report, approximately 4.6 million, or 8 percent, of the nation's children, ages 6-21, received special education services during the 1992-93 school year (under IDEA, Part B, and Chapter 1/ESEA.SOP). OSEP's total estimate is similar to the service population estimate of 7.9 percent, provided in 1980 by the Office of Civil Rights and reported by NCES in its 1985 report on disabilities based on HS&B (Owings and Stocking 1985).

[3] The actual percentage of learning disabled students in NELS:88 is higher because, according to NELS:88 parent reports, about 54 percent of the students classified under "multiple disabilities" had learning disability-related problems.

across special education service categories again underscore the complicated nature of the population of students with disabilities who are the focus of this report.

Table A.4— Distribution of students with disabilities being served by special education programs, by disability category

	OSEP[1] (6 - 21)	NLTS[2] (13 - 21)	NELS:88[3] (grade 8)	
			Received services	Has disability
All disabilities	100.0	100.0	100.0	100.0
Specific learning disabilities	51.3	55.7	27.3	26.7
Speech or language impairments	21.7	3.4	24.4	5.6
Mental retardation	11.3	23.9	0.0	0.1
Serious emotional disturbances	8.8	10.5	7.6	9.3
Multiple disabilities[4]	2.3	1.6	20.4	20.1
Hearing impairments/deafness	1.3	2.1	5.2	8.8
Other health impairments	1.4	1.3	6.5	15.9
Orthopedic impairments	1.1	1.2	4.8	6.8
Visual impairments	0.5	0.7	3.6	6.7
Autism	0.4	--	--	--
Traumatic brain injury	0.1	--	--	--
Deaf-Blindness	0.0	< 0.1	--	--

(--) Indicates that estimates are not available because these low-incidence disability categories, added under the IDEA in 1990, were not included in either the NLTS or NELS:88 surveys.

[1] Modified presentation of data from table AA25, *Sixteenth Annual Report to Congress on the Implementation of the Individuals with Disabilities Education Act* (1994). U. S. Department of Education, Office of Special Education and Rehabilitative Services.

[2] Data from SRI International (December 1993). *The Transition Experiences of Young People with Disabilities: A Summary of Findings from the National Longitudinal Transition Study of Special Education Students*. Menlo Park, CA: Author.

[3] Two weighted percentage columns are provided for NELS:88 data. The first, "Received services," presents the distribution of percentages of students reported by parents to have ever received services for a disability-related problem (BYP48) in the base-year survey. The second, "Has disability," presents the distribution of percentages of students reported by parents to have a disability-related problem (BYP47) in the base-year survey.

[4] The "Multiple disabilities" category in the OSEP and NLTS data sets represents a separate and discrete disability category. It is a low-incidence disability category that includes students who are generally severely impaired and low functioning. "Multiple disabilities" was not a separate disability response category in the NELS:88 parent survey; rather, it is a composite category that includes students whose parents indicated they had more than one disability-related problem or had received services for more than one problem—hence, the relatively high proportion of students with "multiple disabilities" in NELS:88.

Students with Disabilities Excused from National Studies

As described in the 1995 NCES report, *Sample Exclusion and Undercoverage in NELS:88*, some students have been systematically excused from participation in cross-sectional assessments such as NAEP and from longitudinal studies including HS&B and NELS:88. Traditionally, students have been excused from participation in these studies primarily on the basis of mental or physical disability or limited-English proficiency. For example, the "exclusion criteria" for NAEP from 1990 to 1994 specified that a student identified as having an Individualized Education Program (IEP) or equivalent classification may be excluded from the assessment if (1) "the student is mainstreamed less than 50 percent of the time in academic subjects and is judged incapable of participating meaningfully in the assessment," OR (2) "the IEP team or equivalent group has determined that the student is incapable of participating meaningfully in

the assessment" (Westat, Inc. 1994). Similarly, NELS:88 excused "mentally handicapped students and students not proficient in English, for whom the NELS:88 tests would be unsuitable; and students having physical or emotional problems that would make participation in this survey unwise or unduly difficult."

This policy of selective exclusion and its impact on resulting data, due to undercoverage bias, have been the subject of recent debate. For example, efforts are underway, under Section 421(c)(3) of the Perkins Act, to facilitate appropriate assessments of these traditionally excluded students to "ensure valid and reliable comparisons with the general student population..." (Ingels 1995). Similarly, NAEP is currently re-evaluating its criteria for excusing students from participation, and NELS:88 has taken steps to follow up BYI students and to reassess their eligibility for participation as described below.

To develop a comprehensive picture of students with disabilities using any additional data set, it is important to consider the potential bias resulting from the exclusion of students who were judged ineligible to participate on the basis of disability. To permit examination of this issue, NELS:88 procedures included (1) collection of descriptive data on students excused from this study (i.e., base-year ineligible, or BYI, students), and (2) periodic review of the survey eligibility of these students and their inclusion in subsequent follow-ups to the extent possible. As a result of these periodic reviews, almost 200 students who were BYI on the basis of judged mental or physical disability subsequently became eligible to participate in NELS:88 follow-ups.[4]

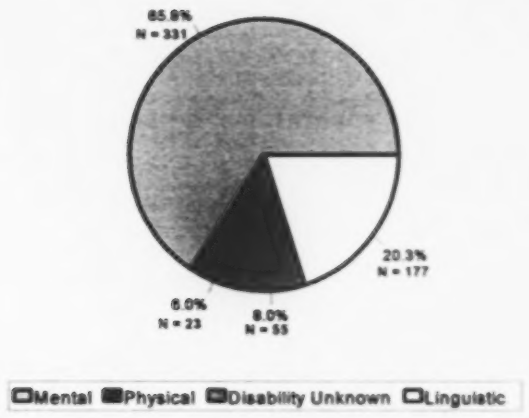
Which students were excused from NELS:88? During the base year, some 584 8th-graders, representing 4.7 percent of the entire eighth-grade population, were excluded from NELS:88 for reasons of physical, mental, or language barriers. As shown in figure A.1, most of these students were excused for reasons of mental disability (331 students, or 66 percent). This group likely included students with mental retardation who were otherwise missing from the NELS:88 database.[5] Demographic data are available for this entire BYI sample, and more extensive data are available for the approximately 188 BYI students with mental disabilities who subsequently were judged by school personnel as eligible to participate in the NELS follow-up surveys.[6]

[4] The BYI population is described in detail in the most recent NCES report related to sample exclusion: Ingels, S.J. (1995) *National Education Longitudinal Study of 1988 Second Follow-up—Sample Exclusion and Undercoverage in NELS:88: Characteristics of Base Year Ineligible Students; Changes in Eligibility Status After Four Years* (Technical Report).

[5] In the base year, parents identified less than 0.1 percent of students as having "mental retardation." According to OSEP's most recent report to Congress, students with mental retardation represent approximately 0.9 percent of the population (see table A.3).

[6] Data are also available for the BYI sample of students excluded for reasons of physical disability (23 in the original BYI sample, and 13 who returned in the follow-up).

Figure A.1 Base-year ineligibles by reason for exclusion
Weighted Percents



SOURCE: National Education Longitudinal Study of 1988, Second Follow-up, NCES, US ED.

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Appendix B
NELS:88 Disability Estimates Based on Alternative Disability Definitions

Chapter 2 of this report reviews the alternative definitions of disability status available in NELS:88 and provides rationales for the definitions used in the later chapters of this report. *This appendix expands upon the discussion of chapter 2, providing estimates and unweighted sample sizes based on alternative definitions of disability for the primary NELS:88 data sources: parents, teachers, students, and school officials.*

Students Identified by Parents as Disabled

Table B.1 describes the unweighted sample sizes and the (base-year) weighted population percentages associated with each of four alternative disability definitions based on the 10 disability-related problems reported by parents in the base year. Students identified by parents as having more than one disability-related problem under any of these four definitions are additionally classified as having "multiple problems" and are reported in a separate "multiple problems" category (in addition to being reported within each single disability category with which they have been identified). Although "multiple problems" in this case describes a different population from the one identified by the "multiple disabilities" category used for federal reporting under IDEA, it has been argued that those students with more than a single reported disability in NELS:88 are likely to have different outcomes and characteristics than those with a single type of disability (e.g., Hodapp and Krasner 1994). It should be noted that the multiple problems category in table B-1 differs in definition from the one used in the body of this report. Throughout the body of the report, the multiple problems category is defined in terms of three disability categories: LD, HP, and PE. In table B-1, Multiple problems is defined in terms of the 10 specific problems that are listed.

The use of one or another of the four definitions presented in table B.1 depends upon the aims and scope of the analyses that are planned. In generating the prevalence estimates in appendix A, for example, only the first two definitions were used, as they were likely the indicators most comparable to those used to describe disability status in the other national surveys and data sets presented (e.g., in tables A.3 and A.4). If extensive analyses were planned using data from all three NELS:88 surveys (i.e., the base year and first and second follow-ups), then the third definition might be preferable, as it is the one that provides the largest sample sizes. (This would most likely be the case if the research questions being examined with these over-time data were rather broad-ranging—e.g., identifying possible factors affecting parental aspirations for their children.) Alternatively, the fourth definition, which requires *both* identification of a

problem *and* description of a service received for that problem, may be preferred as it likely increases the accuracy of parents' judgments of disability status.

Table B.1— Alternative approaches to definition disability status using the NELS:88 Base-Year Parent Survey

	(1) Problems reported		(2) Services reported		(3) Problem *or* services reported		(4) Problem *and* services reported	
	Unwgt. N.	Wgt. %	Unwgt. N	Wgt. %	Unwgt. N	Wgt. %	Unwgt. N	Wgt. %
Not Identified	18,687	82.4	17,556	78.9	16,872	73.9	19,517	88.3
Identified - Total	3,901	17.6	4,494	21.1	5,724	26.1	2,519	11.7
Visual handicap	398	1.8	284	1.3	525	2.4	157	0.7
Hearing problem	536	2.5	434	2.0	728	3.3	242	1.2
Deafness	93	0.4	65	0.3	113	0.5	45	0.2
Speech problem	406	1.8	1,468	7.3	1,557	7.4	317	1.5
Orthopedic problem	201	0.9	247	1.2	318	1.4	130	0.6
Other physical disability	256	1.2	194	1.0	326	1.5	124	0.6
Specific learning problem	1,471	6.6	1,750	8.3	2,061	9.4	1,160	5.5
Emotional problem	744	3.4	759	3.5	1,069	4.8	434	2.0
Mental retardation	19	0.1	11	0.0	24	0.1	6	0.0
Other health problem	926	4.2	591	2.7	1,071	4.8	446	1.9
Multiple problems[a]	841	3.9	971	4.5	1,351	6.2	419	1.9

(a) "Multiple problems" is a composite category including those students whose parent(s) indicated had more than one disability-related problem/service received.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Survey.

For the present report, both the accuracy of parental identification and the adequacy of sample sizes for comparing education-related outcomes of disabled and nondisabled students are concerns. Although it appears from columns 1 and 2 in table B.1 that the largest discrepancies in parents' reports of problems and services were related to speech, specific learning, and other health problems, columns 3 and 4 of the table indicate the considerable lack of overlap between reports of problems and services received over all the disability categories. Since our aim is to identify students with disabilities in the base year, the data from column 1 of table B.1 are the most pertinent; however, there is a marked gain in confidence about the accuracy of these estimates when they are associated with the data from column 2. (Note that students identified in column 2 may include those who either outgrew or had ameliorated for them a previously detected disability.) Simply put, the students identified in column 4 (i.e., those who were reported to have disability-related problems in 1988 *and* to have ever received services for those problems) are those who seem most likely to have had a disability at the time of the base-year survey.

To provide sufficient sample sizes for analysis, it is useful to combine the disability categories in a meaningful way. Table B.2 presents the unweighted sample sizes and (base-year) weighted population percentages associated with the categorization scheme used in this report. The clustering of disabilities shown in table B.2 is based on consideration of both the similarities of particular disability types and the need for comparability with the other disability indicators available from NELS:88. As shown, the sample sizes for learning disability (LD) and other

health problems (HP) are sufficient for these disability types to be presented and analyzed separately, although the few cases of mental retardation have been added into the LD category because both are cognitive disabilities. Physical disability (P) includes orthopedic problem and other physical disability; emotional problem (E) represents a single disability-related problem in NELS:88; and sensory problem (SE) includes visual handicap, hearing problem, deafness, and speech problem. A composite category, physical or emotional problem (PE), has been created to provide comparability between the samples of students identified by parents and those identified by teachers, since the NELS:88 teacher surveys combine these two disability categories, as discussed below.

Table B.2— Definition of clusters of disabilities based on problems and services reported by parents during the NELS:88 Base-Year Survey

Problem(s) and service(s) reported at base year	Unwgt. N	Wgt. % (BYQWT)
Not identified	19,517	88.3
Identified	2,519	11.7
Multiple problems	321	1.5
Learning disability (LD)	1,164	5.4
Health problem (HP)	446	1.9
Physical or emotional problem (PE)	1,257	5.7
Physical disability (P)	239	1.1
Emotional problem (E)	434	2.0
Sensory problem (SE)	668	3.1

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Survey.

Students Identified by Teachers as Disabled

Table B.3 presents the unweighted sample sizes and weighted population percentages of students *identified as disabled by at least one teacher during the base year or first follow-up*. Table B.3 is designed to create comparability of teacher data across the base year and first follow-up; it provides consistent teacher definitions of disability status over time, which can be used for either cross-sectional or panel analyses of data. Column 1 of this table provides the (base-year) weighted population percentages in each disability category included on that year's survey.

Table B.3— Alternative approaches to defining disability using NELS:88 Base-Year and First Follow-up Teacher Surveys

	(1)		(2)		(3)		(4)		(5)	
	Reported at base year (BY) (BY cross-section)[a]		Reported at 1st follow-up (1st cross-section)		Reported BY *or* 1st follow-up (1st cross-section)		Reported BY *or* 1st follow-up (panel BY-F1)		Reported BY *and* 1st follow-up (panel BY-F1)	
	Unwgt. N.	Wgt. %	Unwgt. N	Wgt. %	Unwgt. N	Wgt. %	Unwgt. N	Wgt. %	Unwgt. N	Wgt. %
Not identified[b]	21,698	95.5	14,782	92.9	15,652	91.0	15,652	91.0	13,697	99.6
Identified	970	4.5	1,069	7.1	1,439	9.0	1,439	9.0	53	0.4
Health problem (HP)	502	2.4	468	3.1	692	4.6	692	4.6	22	0.1
Physical or emotional handicap (PE)	602	2.8	738	5.0	977	6.0	977	6.0	33	0.3
Mult. prob.[c]	134	0.6	137	0.9	230	1.5	230	1.5	2	0.0

(a) The population listed in parentheses is the reference population (i.e., sample estimates refer to these populations).

(b) For purposes of comparability over time, students identified by teachers as having a learning disability (LD) at the first follow-up are not included in this table under "Identified." They would be included in the "Not identified" samples in columns 2,3, and 4.

(c) "Multiple problems" includes those students whose teacher(s) indicated had both a health problem and a physical or emotional handicap. The label "Multiple problems" is used to provide comparability with other NELS:88 indicators.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Survey.

Column 2 provides the (first follow-up) weighted population percentages in the three disability categories covered by the survey in 1990 (e.g., health problem, physical or emotional handicap, and both [multiple problems]). Column 3 describes students in the first follow-up cross-sectional sample, including students in the "freshened" sample who were reported as having either of these problems in the base year or first follow-up (i.e., those students who were *ever* identified as disabled in the base year or first follow-up). Columns 4 and 5 show the (first follow-up-panel)[7] weighted population percentages of the students who were *identified by at least one teacher* as having *ever* fallen behind due to a health problem or as currently having a physical or emotional handicap in *either* (column 4) and *both* (column 5) time periods.[8] Together, the columns in table B.3 describe five possible approaches to using comparable teacher data to define students' disability status between the base year and first follow-up.

Columns 1 and 2 are the most straightforward definitions of disability status. However, use of column 1 provides no opportunity to examine students with teacher-identified learning disabilities because the base-year teacher survey did not include an indicator for learning disability. Similarly, columns 4 and 5, which may respectively provide the most inclusive and

[7] The first follow-up panel weight is used in deriving these estimates because generalization in these cases is to the population of U.S. eighth-graders in 1988 who participated in NELS:88 as sophomores in 1990.

[8] Requiring *both* respondent teachers to agree on disability status would provide a more rigorous definition than the criterion *"at least one teacher."* However, the sample sizes were not adequate to use the more stringent definition, due to missing data.

stable estimates based on over-time measurement of teachers in NELS:88, offer no such opportunities with respect to learning disabilities.[9]

Students with learning disabilities represent the largest segment of the target population of students with disabilities across virtually all national data sets, as discussed in appendix A (see table A.4). The definitions of disability presented in table B.3 do not include this important population, and it should be considered when characterizing the experiences and outcomes of students with disabilities. Therefore, it appears preferable to rely solely on first follow-up data from teachers, which includes those students identified by teachers as having learning disabilities.

Table B.4 presents alternative approaches to defining disability status using first follow-up teacher surveys. Because NELS:88 relied on data reported from pairs of teachers at first follow-up, it is also important to consider whether teacher agreements on disability status may be used to bolster the reliability of the identifications that were reported. As shown in column 1, requiring at least one teacher to identify a student as disabled provides the largest sample size, but as the least stringent criterion for defining disability status, it might be thought to provide the least reliability. In fact this is not the case, given that (1) teacher-respondents were selected from core curriculum areas (i.e., mathematics, English, social studies, and science) rather than from special education, and (2) learning disabilities, for example, may be manifested differentially as a function of subject matter. For these reasons, the opinion of either teacher as to a student's disability status must be regarded seriously—whether or not there is agreement across teachers. Column 1, therefore, describes the definition used in this report. Requiring the agreement of both teachers, as shown in column 2, is not useful due to the many cases missing one teacher's report on disability status. And, basing a definition of disability on the agreement of *all respondent* teachers concerning a student's disability status (column 3) overlooks the possibility of a disability being detected in only a particular core subject area.

[9] It is possible that some teachers at base year identified some students they perceived as having a learning disability as having a physical or emotional handicap, but it is more likely that most teachers did not identify LD students at all.

Table B.4— Alternative approaches to defining disability status using NELS:88 First Follow-up Teacher Surveys

	(1) At lease one teacher reporting		(2) Both teachers reporting		(3) All respondent teachers reporting	
	Unwgt. N.	Wgt. %	Unwgt. N	Wgt. %	Unwgt. N	Wgt. %
Not identified	12,337	77.0	11,473	94.8	14,310	89.7
Identified	3,534	23.0	610	5.2	1,561	10.3
Health problem (HP)	1,176	7.5	186	1.5	468	3.1
Physical or emotional handicap (PE)	1,895	12.8	231	2.0	738	5.0
Learning disability (LD)	1,606	10.7	284	2.5	711	4.7
Multiple problems[a]	1,011	6.8	87	0.7	326	2.2

(a) "Multiple problems" includes those students whose teacher(s) indicated had more than one category of problem.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Survey.

Students Who Self-Identify Themselves as Disabled

Table B.5 summarizes the various ways items on special program participation from the first and second follow-up student surveys might be used to define populations of disabled students. Columns 1 and 2, respectively, present the sample sizes and (first and second follow-up) weighted population percentages based on students' responses to items at each follow-up. Columns 4 and 5 present the sample sizes and (first and second follow-up-panel) weighted population percentages based on the responses from students at both follow-ups (i.e., either indicating special program participation at one or the other time-point or at both time-points). Finally, column 3 presents weighted sample percentages and describes students from the first or second follow-up cross-sectional samples who reported themselves as "ever" having been in special programs in high school.

Table B.5— Alternative approaches to defining disability status using NELS:88 First and Second Follow-up Student Surveys

	(1)		(2)		(3)		(4)		(5)	
	Reported at 1st follow-up (F1) (1st cross-section)[a]		Reported at 2nd follow-up (2nd cross-section)		Reported 1st or 2nd follow-up (2nd cross-section)		Reported 1st *or* 2nd follow-up (panel BY-F2)		Reported 1st *and* 2nd follow-up (panel F1-F2)	
	Unwgt. N	Wgt. %	Unwgt. N	Wgt. %	Unwgt. N	Wgt. %	Unwgt. N	Wgt. %	Unwgt. N	Wgt. %
Not identified	17,375	96.8	16,090	97.2	17,648	95.4	16,110	95.5	14,627	99.3
Identified	493	3.2	380	2.8	731	4.6	641	4.5	87	0.7
Educationally handicapped (LD)	385	2.6	319	2.5	592	3.9	517	3.8	71	0.6
Physically handicapped (P)	249	1.5	130	0.9	348	2.1	304	2.1	20	0.1
Mult. prob.[b]	141	0.9	69	0.6	209	1.4	180	1.4	4	0.0

(a) The population listed in parentheses is the reference population (i.e., sample estimates refer to these populations).

(b) "Multiple problems" includes those students who indicated that they had participated in special programs for both educational and physical handicaps during high school. The label "multiple problems" is used to provide comparability with other NELS:88 indicators.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Survey.

The strength of the rationale for use of any of the definitions in columns 3 through 5 of table B.5 depends on the suspected accuracy of students' reports, the overlap between the reported information for individual students at the two time-points, and the comparisons to be made with disability definitions from other sources. Owings and Stocking (1985), for example, note that student self-reports of disability status are subject to change over time, suggesting that the first and second follow-up NELS:88 items on special program participation might define two distinct disability populations. In fact, table B.6 shows that this is the case. In addition, the comparisons that might be made with disability estimates based on other NELS:88 data sources favor keeping these populations separate in analysis. For example, the population defined by students' responses at first follow-up can be compared to the population defined by teachers' first follow-up responses. Similarly, the population defined by students' responses at second follow-up can be compared to the population defined by school officials' judgments of students' disability status, as described below. In this report, we limit our focus to the student-defined disabled population identified at the NELS:88 first follow-up, since it is the definition most proximate in time to those provided by parents and teachers.

Table B.6— Comparison of (unweighted) students' responses regarding special education placements in high school

	2nd follow-up Educationally handicapped		
	Missing	Not identified	Identified
1st follow-up Educationally handicapped			
Missing	8,363	1,329	51
Not identified	2,669	14,600	191
Identified	101	207	77

	2nd follow-up Physically handicapped		
	Missing	Not identified	Identified
1st follow-up Physically handicapped			
Missing	8,369	1,353	15
Not identified	2,702	14,806	94
Identified	69	159	21

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Survey.

Students Identified as Ineligible to Participate Due to Disabilities

As discussed in chapter 2, about 5 percent of 8th-graders in the NELS:88 base-year sample of schools were excused from participation by school officials due to limitations in language proficiency or to mental or physical disabilities. Of these excluded students, about two-thirds (66 percent) were excused due to mental disability. In NELS:88 follow-up surveys, special efforts were made to reassess whether these and other excused students should be allowed to participate. These efforts resulted in the return of 133 BYI students with mental disabilities to the NELS:88 first follow-up and 156 such students to the second follow-up. The progress of these students through the education system provides yet another perspective on the educational experiences of disabled students for this report. In fact, BYI students who participated in NELS:88 follow-up surveys may already be included in analyses of data for disabled populations defined by teachers, students, and school officials.

Appendix C
Standard Errors

Table C.3.1— Standard errors (for table 3.1) of percentage of students with disabilities, as identified by parents and teachers, who were male, the percentage who were members of an ethnic/racial minority group, and average age (NELS:88 Second Follow-up Student Survey)[a]

Source of Disability Information	Parent Base Year			Teacher First Follow-up		
Variable	Sex Male	Race Minority [b]	Age [c]	Sex Male	Race Minority [b]	Age [c]
Disability status [d]						
Not identified	0.70	1.17	0.010	0.66	1.14	0.014
Identified	1.89	1.89	0.039	1.23	1.45	0.019
Multiple problems	5.80	5.85	0.182	2.34	2.44	0.034
Learning disabled	2.61	2.23	0.070	1.94	2.29	0.035
Health problem	4.74	5.15	0.066	2.17	2.11	0.026
Physical/emotional problem	2.73	2.79	0.067	1.81	1.89	0.027
Physical disability	5.33	4.80	0.065	--	--	--
Emotional problem	6.17	6.28	0.162	--	--	--
Sensory disability	3.05	2.85	0.055	--	--	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Minority includes Asian or Pacific Islander, Hispanic, black, and American Indian or Alaskan Native.
(c) Mean age is calculated using the BIRTHYR variable; that is, subtracting a student's birthyear from 1988.
(d) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Student Survey.

Table C3.2— Standard errors (for table 3.2) of percentage of students with disabilities, as identified by parents and teachers, who were of various races (NELS:88 Second Follow-up Student Survey)[a]

Source of Disability Information	Parent Base Year			Teacher First Follow-up		
Variable	Race			Race		
	Black	*White*	*Other*	*Black*	*White*	*Other*
Disability status [b]						
Not identified	0.89	1.17	0.83	0.79	1.14	0.87
Identified	1.61	1.89	1.10	1.11	1.45	1.09
Multiple problems	5.96	5.85	2.71	1.97	2.44	1.87
Learning disabled	1.58	2.23	1.63	1.93	2.29	1.63
Health problem	5.26	5.15	2.33	1.71	2.11	1.55
Physical/emotional problem	2.71	2.85	1.56	1.45	1.89	1.45
Physical disability	2.54	4.80	4.54	--	--	--
Emotional problem	6.43	6.28	2.41	--	--	--
Sensory disability	2.31	2.85	1.84	--	--	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Student Survey.

Table C.3.3— Standard errors (for table 3.3) of percentage of students with disabilities, as identified by parents and teachers, who were in each SES quartile and had parents with various education levels (NELS:88 Base-Year Parent Survey)[a]

Source of Disability Information	Parent Base Year								Teacher First Follow-up							
Variable	SES Quartile				Parents' Highest Education				SES Quartile				Parents' Highest Education			
	Low 1st Q	2nd Q	3rd Q	High 4th Q	< HS	HS	Some College	4yr + College	Low 1st Q	2nd Q	3rd Q	High 4th Q	< HS	HS	Some College	4yr + College
Disability status [b]																
Not identified	0.84	0.66	0.65	0.96	0.61	0.61	0.76	0.96	0.74	0.64	0.61	1.01	0.52	0.57	0.73	0.95
Identified	1.76	1.55	1.48	2.29	2.29	1.51	1.92	2.20	1.23	1.02	1.09	1.12	0.74	1.11	1.19	1.13
Multiple problems	5.85	3.76	3.67	5.59	5.63	3.21	5.50	5.71	2.20	2.15	1.74	2.04	1.41	1.93	2.23	1.92
Learning disabled	5.36	3.14	2.79	3.74	3.18	2.90	4.48	3.73	1.78	1.84	2.01	2.15	1.32	1.72	2.27	2.22
Health problem	2.22	2.32	1.92	3.86	3.46	2.16	2.82	3.79	1.84	1.58	1.56	1.90	1.14	2.00	1.97	1.79
Physical/emotional problem	2.71	2.14	2.43	2.61	2.20	2.26	2.79	2.59	1.81	1.62	1.72	1.54	1.05	1.64	1.85	1.48
Physical disability	5.47	3.15	5.02	3.25	3.56	4.58	5.54	3.95	--	--	--	--	--	--	--	--
Emotional problem	5.98	3.57	5.20	5.88	5.51	5.03	6.09	5.67	--	--	--	--	--	--	--	--
Sensory disability	2.96	2.92	2.46	2.72	1.70	2.35	3.27	2.73	--	--	--	--	--	--	--	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey.

Table C.3.4— Standard errors (for table 3.4) of percentage of students with disabilities, as identified by parents and teachers, who lived in single female-headed households (NELS:88 Base-Year Parent Survey)[a]

Source of Disability Information	Parent Base Year	Teacher First Follow-up
Variable	% Female-headed household at BY	% Female-headed household at BY
Disability status [b]		
Not identified	0.65	0.54
Identified	1.45	1.04
Multiple problems	5.09	2.36
Learning disabled	1.94	1.60
Health problem	3.09	1.78
Physical/emotional problem	2.45	1.84
Physical disability	3.64	--
Emotional problem	6.48	--
Sensory disability	3.28	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey.

Table C.3.5— Standard errors (for table 3.5) of mean locus of control scores, over time, of students with disabilities (NELS:88 Base-Year, First, and Second Follow-up Student Surveys), as identified by parents and teachers[a]

Source of Disability Information	Parent Base Year			Teacher First Follow-up		
Variable	Base Year	First Follow-up	Second Follow-up	Base Year	First Follow-up	Second Follow-up
Disability status [b]						
Not identified	0.012	0.013	0.013	0.009	0.011	0.011
Identified	0.028	0.036	0.039	0.020	0.023	0.021
Multiple problems	0.071	0.129	0.127	0.042	0.041	0.040
Learning disabled	0.036	0.046	0.062	0.033	0.044	0.034
Health problem	0.070	0.103	0.115	0.038	0.040	0.036
Physical/emotional problem	0.043	0.056	0.053	0.033	0.030	0.036
Physical disability	0.096	0.093	0.135	--	--	--
Emotional problem	0.092	0.142	0.119	--	--	--
Sensory disability	0.046	0.052	0.054	--	--	--

(--) Not available.

(a) Data represent the eighth-grade panel population.

(b) Locus of control score is standardized; mean = 0, s.d. = 1.0. Positive locus of control scores indicate greater internal control, while negative scores indicate less internal control.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, First and Second Follow-up Student Surveys.

Table C.3.6— Standard errors (for table 3.6) of mean self-concept scores, over time, of students with disabilities (NELS:88 Base-Year, First, and Second Follow-up Student Surveys), as identified by parents and teachers[a]

Source of Disability Information	Parent Base Year			Teacher First Follow-up		
Variable	Base Year	First Follow-up	Second Follow-up	Base Year	First Follow-up	Second Follow-up
Disability status [b]						
Not identified	0.028	0.030	0.034	0.010	0.010	0.012
Identified	0.028	0.030	0.034	0.017	0.019	0.020
Multiple problems	0.073	0.103	0.091	0.034	0.039	0.045
Learning disabled	0.035	0.040	0.048	0.026	0.033	0.037
Health problem	0.066	0.090	0.090	0.031	0.038	0.042
Physical/emotional problem	0.045	0.047	0.049	0.025	0.029	0.031
Physical disability	0.109	0.075	0.081	--	--	--
Emotional problem	0.100	0.112	0.095	--	--	--
Sensory disability	0.044	0.045	0.058	--	--	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Self-concept score is standardized; mean = 0, s.d. = 1.0. Positive self-concept scores indicate greater internal control, while negative scores indicate less internal control.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, First and Second Follow-up Student Surveys.

Table C.3.7— Standard errors (for table 3.7) of percentage of students with disabilities, as identified by parents and teachers, who were in different school environments and who received free or reduced-price lunch (NELS:88 Base-Year School Survey)[a]

Source of Disability Information	Parent Base Year				Teacher First Follow-up			
Variable	Urban	Suburban	Rural	Avg. % of students in school lunch program [b]	Urban	Suburban	Rural	Avg. % of students in school lunch program [b]
Disability status [c]								
Not identified	1.59	1.84	1.75	0.85	1.54	1.90	1.84	0.88
Identified	2.59	2.66	2.22	1.39	1.79	2.17	2.07	0.95
Multiple problems	6.14	5.90	4.63	4.40	2.69	2.93	2.75	1.30
Learning disabled	5.44	4.76	4.25	1.60	2.69	2.88	2.74	1.28
Health problem	3.91	3.74	3.06	3.86	2.53	2.92	2.70	1.16
Physical/emotional problem	3.10	3.35	2.56	2.07	2.24	2.67	2.60	1.16
Physical disability	4.19	5.73	4.74	2.77	--	--	--	--
Emotional problem	6.54	6.45	3.63	4.43	--	--	--	--
Sensory disability	3.11	3.54	3.20	1.90	--	--	--	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) "School lunch program" refers to free or reduced-price school lunch program.
(c) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Base-Year School Survey.

Table C.3.8— Standard errors (for table 3.8) of percentage of students who identified themselves as disabled, who were male, members of minority groups, and in various SES quartiles (NELS:88 Base-Year Student and Parent Surveys)[a]

Source of Disability Information: Student-Identified Disability at First Follow-up

Variable	Sex	Race	SES Quartiles			
			Low			High
	% Male	% Minority	1st Q	2nd Q	3rd Q	4th Q
Disability status [b]						
Not identified	0.63	1.13	0.76	0.62	0.58	0.91
Identified	3.95	3.38	2.79	3.88	3.42	4.94

(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); First Follow-up Student Survey, Base-Year Student and Parent Surveys.

Table C.3.9— Standard errors (for table 3.9) of mean self-concept and locus of control scores of students who identified themselves as disabled (NELS:88 Second Follow-up Student Survey)[a]

Source of Disability Information	Student-Identified Disability at First Follow-up	
Variable	Self-concept at 2nd Follow-up	Locus of control at 2nd Follow-up
Disability status [b]		
Not identified	0.011	0.011
Identified	0.072	0.058

(a) Data represent the eighth-grade panel population.
(b) Self-concept and locus of control scores are standardized; means for both = 0, s.d. = 1.0.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); First Follow-up Student Survey, Second Follow-up Student Survey.

Table C.4.1— Standard errors (for table 4.1) of percentage of students with disabilities, as identified by parents and teachers, who ever repeated a grade prior to eighth grade (NELS:88 Base-Year Parent Survey)[a]

Source of Disability Information	Parent Base Year	Teacher First Follow-up
Variable	% Repeated grade before eighth grade	% Repeated grade before eighth grade
Disability status [b]		
Not identified	0.72	0.46
Identified	2.07	1.21
Multiple problems	5.37	2.33
Learning disabled	3.35	2.22
Health problem	3.65	1.74
Physical/emotional problem	2.72	1.72
Physical disability	5.21	--
Emotional problem	5.72	--
Sensory disability	3.18	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey.

Table C.4.2— Standard errors (for table 4.2) of percentage of students with disabilities, as identified by parents and teachers, who reported ever having participated in remedial English or mathematics programs during high school (NELS:88 Second Follow-up Student Survey)[a]

Source of Disability Information	Parent Base Year		Teacher First Follow-up	
Variable	% Ever in remedial		% Ever in remedial	
	English	Math	English	Math
Disability status [b]				
Not identified	0.68	0.68	0.56	0.56
Identified	2.00	2.19	1.36	1.34
Multiple problems	5.09	6.63	2.48	2.45
Learning disabled	3.99	4.01	2.21	2.20
Health problem	2.81	3.30	2.03	2.02
Physical/emotional problem	2.29	3.05	2.03	2.02
Physical disability	4.24	4.22	--	--
Emotional problem	5.70	7.26	--	--
Sensory disability	2.75	2.76	--	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Student Survey.

Table C.4.3— Standard errors (for table 4.3) of percentage of students with disabilities, as identified by parents and teachers, who reported having participated in high school dropout prevention programs (NELS:88 Second Follow-up Student Survey)[a]

Source of Disability Information	Parent Base Year	Teacher First Follow-up
Variable	Ever participated in program for dropout prevention	Ever participated in program for dropout prevention
Disability status [b]		
Not identified	0.29	0.15
Identified	0.62	0.52
Multiple problems	2.34	1.06
Learning disabled	0.77	0.83
Health problem	2.64	0.72
Physical/emotional problem	0.85	0.88
Physical disability	1.61	--
Emotional problem	2.66	--
Sensory disability	0.65	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Student Survey.

Table C.4.4— Standard errors (for table 4.4) of percentage of students with disabilities, as identified by parents and teachers, who reported having participated in programs for the educationally or physically handicapped (NELS:88 Second Follow-up Student Survey)[a]

Source of Disability Information	Parent Base Year		Teacher First Follow-up	
Variable	Ever participated in program for:		Ever participated in program for:	
	Educationally handicapped	Physically handicapped	Educationally handicapped	Physically handicapped
Disability status [b]				
Not identified	0.15	0.10	0.12	0.11
Identified	2.57	2.32	0.53	0.33
Multiple problems	7.75	1.58	1.12	1.04
Learning disabled	4.91	4.79	0.96	0.68
Health problem	1.04	0.75	0.64	0.44
Physical/emotional problem	2.86	0.74	0.84	0.58
Physical disability	2.44	2.85	--	--
Emotional problem	9.46	0.82	--	--
Sensory disability	1.18	0.71	--	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Student Survey.

Table C.4.5— Standard errors (for table 4.5) of percentage of students with disabilities, as identified by parents and teachers, who participated in special education (NELS:88 Second Follow-up Transcript Component)[a]

Source of Disability Information	Parent Base Year	Teacher First Follow-up
Variable	Participated in special education	Participated in special education
Disability status [b]		
Not identified	0.17	0.16
Identified	1.36	0.68
Multiple problems	5.48	1.57
Learning disabled	2.73	1.40
Health problem	2.99	0.79
Physical/emotional problem	1.99	0.92
Physical disability	4.60	--
Emotional problem	4.78	--
Sensory disability	2.72	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status; percentages are derived using the 8th-12th grade transcript panel weight (F2TRP1WT).

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Transcript Component.

Table C.4.6— Standard errors (for table 4.6) of total units in core subjects completed by students with disabilities (NELS:88 Second Follow-up Transcript Component), as identified by parents and teachers[a]

Source of Disability Information	Parent Base Year			Teacher First Follow-up		
Variable	2nd Follow-up			2nd Follow-up		
	Average English units	Average math units	Average science units	Average English units	Average math units	Average science units
Disability status						
Not identified	0.03	0.03	0.03	0.02	0.02	0.03
Identified	0.09	0.12	0.07	0.05	0.04	0.03
Multiple problems	0.32	0.55	0.28	0.09	0.07	0.06
Learning disabled	0.13	0.24	0.11	0.09	0.07	0.06
Health problem	0.23	0.17	0.21	0.07	0.07	0.05
Physical/emotional problem	0.14	0.21	0.12	0.07	0.05	0.05
Physical disability	0.22	0.25	0.18	--	--	--
Emotional problem	0.33	0.57	0.31	--	--	--
Sensory disability	0.14	0.10	0.09	--	--	--

(--) Not available.

(a) Data represent the eighth-grade panel population; percentages are derived using the 8th-12th grade transcript panel weight (F2TRP1WT).

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Transcript Component.

Table C.4.7— Standard errors for (table 4.7) of percentage of students with disabilities, as identified by parents and teachers, who were involved in school sports and extracurricular activities and whose parents were involved in PTA (NELS:88 Base-Year Parent and Second Follow-up Student Surveys)[a]

Source of Disability Information	Parent Base Year				Teacher First Follow-up			
Variable	Parent involvement		Student involvement		Parent involvement		Student involvement	
	% Attend PTA	% Active PTA	Avg. # sport activities	Avg. # school activities	% Attend PTA	% Active PTA	Avg. # sport activities	Avg. # school activities
Disability status [b]								
Not identified	0.87	0.90	0.01	0.02	0.90	0.91	0.01	0.02
Identified	2.10	1.67	0.04	0.06	1.29	1.22	0.02	0.04
Multiple problems	5.84	2.53	0.10	0.17	2.50	2.22	0.04	0.07
Learning disabled	2.97	2.57	0.09	0.08	2.23	2.14	0.03	0.06
Health problem	5.08	4.01	0.05	0.19	2.24	2.03	0.03	0.07
Physical/emotional problem	2.92	1.95	0.04	0.09	1.93	1.73	0.03	0.05
Physical disability	6.09	4.55	0.06	0.19	--	--	--	--
Emotional problem	6.09	2.88	0.08	0.18	--	--	--	--
Sensory disability	3.30	2.50	0.06	0.09	--	--	--	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Base-Year Parent and Second Follow-up Student Surveys.

Table C.4.8— Standard errors (for table 4.8) of percentage of students who identified themselves as disabled who participated in remedial English or remedial math programs in high school (NELS:88 Second Follow-up Survey)[a]

Source of Disability Information	Student-Identified Disability at 1st Follow-up	
Variable	% Ever participated in:	
	Remedial English	Remedial math
Disability status [b]		
Not identified	0.57	0.55
Identified	3.74	5.23

(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); First Follow-up Student Survey, Second Follow-up Student Survey.

Table C.4.9— Standard errors (for table 4.9) of percentage of students who identified themselves as disabled who were involved in school sports and extracurricular activities and whose parents were involved in PTA (NELS:88 Base-Year Parent and Second Follow-up Student Surveys)[a]

Source of Disability Information	Student-Identified Disability at First Follow-up			
Variable	Parent involvement		Student involvement	
	% Attend PTA	% Active PTA	Avg. # sport activities	Avg. # school activities
Disability status [b]				
Not identified	0.88	0.85	0.01	0.02
Identified	3.71	3.51	0.06	0.15

(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); First Follow-up Student Survey, Base-Year Parent and Second Follow-up Student Surveys.

Table C.5.1— Standard errors (for table 5.1) of average high school grade in English, mathematics, and science of students with disabilities (NELS:88 Second Follow-up Transcript Component), as identified by parents and teachers[a]

Source of Disability Information	Parent Base Year			Teacher First Follow-up		
Variable	English	Mathematics	Science[b]	English	Mathematics	Science[b]
Disability status						
Not identified	0.059	0.056	0.057	0.049	0.053	0.051
Identified	0.137	0.180	0.160	0.069	0.067	0.070
Multiple problems	0.408	0.411	0.292	0.107	0.105	0.117
Learning disabled	0.168	0.366	0.288	0.104	0.092	0.104
Health problem	0.400	0.236	0.286	0.122	0.111	0.126
Physical/emotional problem	0.229	0.180	0.183	0.098	0.103	0.106
Physical disability	0.492	0.261	0.429	--	--	--
Emotional problem	0.478	0.438	0.446	--	--	--
Sensory disability	0.234	0.223	0.188	--	--	--

(--) Not available.

(a) Data represent the eighth-grade panel population; percentages are derived using the 8th-12th grade transcript panel weight (F2TRP1WT).

(b) Grade is based upon a 1-13 scale, where 1.0 = A+ and 13 = F.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Transcript Component.

Table C.5.2— Standard errors (for table 5.2) of percentage of students with disabilities, as identified by parents and teachers, who achieved various levels of 12th-grade proficiency in mathematics (NELS:88 Second Follow-up Student Survey)[a]

Source of Disability Information	Parent Base Year						Teacher First Follow-up					
Variable	Math proficiency at 2nd Follow-up						Math proficiency at 2nd Follow-up					
	Below Level 1	Level 1	Level 2	Level 3	Level 4	Level 5	Below Level 1	Level 1	Level 2	Level 3	Level 4	Level 5
Disability status[b]												
Not identified	0.56	0.7	0.59	0.64	0.85	0.29	0.31	0.64	0.52	0.63	0.85	0.37
Identified	1.58	2.60	2.72	2.10	1.34	1.03	0.95	1.38	0.98	1.22	1.13	0.35
Multiple problems	4.71	6.46	4.62	9.07	3.40	0.45	2.13	2.69	2.09	2.15	1.82	0.33
Learning disabled	2.89	4.25	5.10	3.68	1.17	0.23	1.91	2.23	1.71	2.12	1.34	0.19
Health problem	2.66	4.78	3.22	3.92	3.72	4.30	1.29	2.60	1.93	2.32	2.12	0.85
Physical/emotional problem	2.18	3.47	2.31	3.42	2.25	1.50	1.49	2.20	1.71	1.78	1.91	0.54
Physical disability	6.03	6.06	3.61	5.39	3.78	5.6	--	--	--	--	--	--
Emotional problem	3.94	8.87	2.71	9.75	2.50	1.08	--	--	--	--	--	--
Sensory disability	2.69	3.46	3.40	2.08	3.20	1.18	--	--	--	--	--	--

(--) Not available.

(a) Data represent the eighth-grade panel population.

(b) Percentage represents the distribution within each disability status.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Student Survey.

Table C.5.3— Standard errors (for table 5.3) of percentage of students with disabilities, as identified by parents and teachers, who achieved various levels of proficiency in reading (NELS:88 Second Follow-up Student Survey)[a]

Source of Disability Information	Parent Base Year				Teacher First Follow-up			
Variable	Reading proficiency at 2nd Follow-up				Reading proficiency at 2nd Follow-up			
	Below Level 1	Level 1	Level 2	Level 3	Below Level 1	Level 1	Level 2	Level 3
Disability status [b]								
Not identified	0.39	0.83	0.77	0.68	0.34	0.74	0.71	0.71
Identified	2.63	2.41	2.16	1.40	0.91	1.42	1.32	1.06
Multiple problems	4.83	6.55	4.44	1.41	1.85	2.65	2.56	1.28
Learning disabled	4.80	4.08	3.24	0.92	1.80	2.31	2.03	1.66
Health problem	2.43	4.80	4.64	3.83	1.29	2.32	2.49	2.10
Physical/emotional problem	1.94	3.58	2.84	2.30	1.31	2.10	1.95	1.56
Physical disability	3.16	6.65	5.55	6.08	--	--	--	--
Emotional problem	1.99	7.97	6.05	3.97	--	--	--	--
Sensory disability	3.07	3.53	3.30	2.37	--	--	--	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Student Survey.

Table C.5.4— Standard errors (for table 5.4) of gains in IRT-estimated number right for reading and mathematics tests,[a] Base Year to Second Follow-up, among students with disabilities (NELS:88 Base-Year and Second Follow-up Student Surveys), as identified by parents and teachers[b]

Source of Disability Information	Parent Base Year		Teacher First Follow-up	
Variable	Change in reading: Base Year to 2nd Follow-up	Change in mathematics: Base Year to 2nd Follow-up	Change in reading: Base Year to 2nd Follow-up	Change in mathematics: Base Year to 2nd Follow-up
Disability status [c]				
Not identified	0.110	0.140	0.114	0.141
Identified	0.360	0.383	0.196	0.230
Multiple problems	1.422	1.528	0.377	0.459
Learning disabled	0.540	0.557	0.304	0.395
Health problem	0.534	0.786	0.329	0.346
Physical/emotional problem	0.579	0.603	0.296	0.335
Physical disability	0.715	1.027	--	--
Emotional problem	1.376	1.143	--	--
Sensory disability	0.745	0.870	--	--

(--) Not available.
(a) "IRT-estimated number right" refers to test scores adjusted for individuals' patterns of responses to test items. "IRT" is Item Response Theory.
(b) Data represent the eighth-grade panel population.
(c) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Student Survey.

Table C.5.5— Standard errors (for table 5.5) of percentage of students with disabilities, as identified by parents and teachers, who held or whose parents held various levels of educational expectations (NELS:88 Second Follow-up Student and Parent Surveys)[a]

Source of Disability Information	Parent Base Year								Teacher First Follow-up							
Variable	Student's expectations				Parent's expectations[b]				Student's expectations				Parent's expectations			
	HS or less	Some college	4 yr BA	Post-BA	HS or less	Some college	4 yr BA	Post-BA	HS or less	Some college	4 yr BA	Post-BA	HS or less	Some college	4 yr BA	Post-BA
Disability status[c]																
Not identified	0.49	0.63	0.74	0.67	0.29	0.55	0.68	0.77	0.26	0.63	0.75	0.65	0.24	0.53	0.66	0.73
Identified	0.95	1.94	2.44	1.91	0.98	1.41	2.12	2.68	0.83	1.24	1.10	1.20	0.79	1.13	1.35	1.46
Multiple problems	3.36	5.35	4.01	7.47	1.92	4.79	5.16	8.14	1.94	2.39	1.79	2.48	1.68	2.52	2.76	2.66
Learning disabled	1.59	3.27	4.47	3.18	1.74	2.47	3.61	5.21	1.24	2.16	1.87	1.95	1.24	2.11	2.20	2.30
Health problem	2.52	3.73	4.33	3.74	2.52	3.13	4.36	4.40	1.75	2.03	1.99	2.22	1.26	1.90	2.44	2.49
Physical/emotional problem	1.35	2.40	2.78	3.03	0.88	1.88	2.84	3.29	1.30	2.00	1.61	1.84	1.41	1.80	2.02	2.24
Physical disability	2.57	4.42	5.07	5.95	2.29	3.74	6.31	6.38	--	--	--	--	--	--	--	--
Emotional problem	2.43	5.52	4.56	8.07	1.74	2.92	6.64	8.27	--	--	--	--	--	--	--	--
Sensory disability	1.92	3.06	3.46	2.73	1.05	2.72	3.30	3.64	--	--	--	--	--	--	--	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Data from the Parent Survey are weighted using the Second Follow-up panel weight (F2PNLWT).
(c) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Student and Parent Surveys.

Table C.5.6— Standard errors (for table 5.6) of percentage of students with disabilities, as identified by parents and teachers, who reported that they had completed or intended to complete the Scholastic Assessment Test (SAT) or the American College Test (ACT) (NELS:88 Second Follow-up Student Survey)[a]

Source of Disability Information	Parent Base Year		Teacher First Follow-up	
Variable	SAT *% completed or intended this year*	ACT *% completed or intended this year*	SAT *% completed or intended this year*	ACT *% completed or intended this year*
Disability status [b]				
Not identified	1.05	1.00	0.99	0.97
Identified	2.28	2.46	1.82	1.95
Multiple problems	6.86	4.34	3.60	3.31
Learning disabled	3.55	4.27	2.55	2.18
Health problem	4.33	4.45	3.30	3.28
Physical/emotional problem	3.16	2.89	2.61	3.21
Physical disability	6.23	5.94	--	--
Emotional problem	8.01	4.75	--	--
Sensory disability	3.42	3.43	--	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, Second Follow-up Student Survey.

Table C.5.7— Standard errors (for table 5.7) of percentage of students with disabilities, as identified by parents and teachers, who dropped out of high school (NELS:88 Second Follow-up Student Survey)[a]

Source of Disability Information	Parent Base Year	Teacher First Follow-up
Variable	% ever dropped out [b] since March 1989 at 2nd follow-up	% ever dropped out [b] since March 1989 at 2nd follow-up
Disability status [c]		
Not identified	0.74	0.38
Identified	1.90	1.77
Multiple problems	5.90	4.34
Learning disabled	2.42	2.55
Health problem	5.41	2.91
Physical/emotional problem	2.92	2.79
Physical disability	5.40	--
Emotional problem	6.12	--
Sensory disability	2.64	--

(--) Not available.
(a) Data represent the eighth-grade panel population.
(b) "Ever dropped out" is based on the variable F2EVDOST, which indicates whether or not the sample member ever dropped out in the first follow-up or second follow-up survey. The variable is based on a sample member's dropout history since the beginning of the first follow-up in March 1989.
(c) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base-Year Parent Survey, First Follow-up Teacher Survey, First and Second Follow-up Student Surveys.

Table C.5.8— Standard errors (for table 5.8) of average high school grade in English, mathematics, and science and percentage of students who identified themselves as disabled who dropped out of high school (NELS:88 Second Follow-up and Second Follow-up Transcript Component)[a]

Source of Disability Information	Student-Identified Disability at First Follow-up			
Variable	English	Mathematics	Science [b]	Percent ever dropped out since March 1989 at 2nd Follow-up
Disability status [c]				
Not identified	0.049	0.048	0.048	0.54
Identified	0.208	0.438	0.402	3.24

(a) Data represent the eighth-grade panel population.
(b) Grade is based upon a 1-13 scale, where 1.0 = A+ and 13 = F.
(c) Percentage represents the distribution within each disability status; percentages are derived using the 8th-12th grade transcript panel weight (F2TRP1WT).

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); First Follow-up Student Survey, Second Follow-up Student Survey, and Second Follow-up Transcript Component.

Table C.5.9— Standard errors (for table 5.9) of percentage of students who identified themselves as disabled, who achieved various levels of proficiency in mathematics (NELS:88 Second Follow-up Student Survey)[a]

Source of Information	Student-Identified Disability at First Follow-up					
	% in each level of proficiency					
Variable	Below Level 1	1	2	3	4	5
Disability status [b]						
Not identified	0.35	0.68	0.57	0.57	0.76	0.28
Identified	2.42	6.18	3.66	6.58	2.43	0.86

(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); First Follow-up Student Survey, Second Follow-up Student Survey.

Table C.5.10— Standard errors (for table 5.10) of percentage of students who identified themselves as disabled, who achieved various levels of proficiency in reading (NELS:88 Second Follow-up Student Survey)[a]

Source of Disability Information	Student-Identified Disability at First Follow-up			
	% in each level of proficiency			
Variable	Below Level 1	1	2	3
Disability status [b]				
Not identified	0.45	0.76	0.68	0.64
Identified	2.93	5.61	5.72	2.21

(a) Data represent the eighth-grade panel population.
(b) Percentage represents the distribution within each disability status.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); First Follow-up Student Survey, Second Follow-up Student Survey.

Appendix D
Technical Notes

The National Education Longitudinal Study of 1988 (NELS:88)

In response to the need for policy-relevant, longitudinal data on nationally representative samples of elementary and secondary students, the National Center for Education Statistics (NCES) instituted the National Education Longitudinal Studies (NELS) program, a continuing, long-term project. The general aim of the NELS program is to study the educational, vocational, and personal development of students at various grade levels, as well as the personal, familial, social, institutional, and cultural factors that may affect that development.

The NELS program has consisted of three major studies: The National Longitudinal Study of the High School Class of 1972 (NLS-72), High School and Beyond (HS&B), and the National Education Longitudinal Study of 1988 (NELS:88). The NELS:88 study included a base-year component in 1988, a first follow-up in 1990, and a second follow-up in 1992; the data collected from these three cycles of NELS:88 are the basis for this report. (A third follow-up took place in 1994.)

The major features of NELS:88 include the integration of student, dropout, school, parent, and teacher studies; the initial concentration on an eighth-grade student cohort with follow-ups at 2-year intervals; the inclusion of supplementary components to support analyses of geographically or demographically distinct subgroups; and the design linkages to previous longitudinal studies and other current studies.

Base-Year Sample

As part of the NELS program, a baseline of data on school experiences was collected in 1988 by NCES on a sample of 24,599 eighth-grade students in 1,057 schools across the United States (Owings 1994). First, a two-stage stratified random sample design was used to select nationally representative schools and students. A list of 40,000 public and private schools was obtained from Quality Education Data, Inc. The list contained information about whether a school was urban, suburban, or rural. Additional information about the listed schools concerning racial-ethnic composition was also obtained from the Office of Civil Rights. These schools were then stratified by region, type (public and private), urbanicity, and minority percentage prior to sampling. The number of schools selected for the sample were proportionally representative of geographic regions and urbanization. This process resulted in the selection of the sample described above.

The second stage of the sampling process was the selection of students within schools. Students judged by a representative from the school as unable to complete the survey due to mental or emotional incompetence or limited English proficiency were excluded. These students represented about 5 percent of the original population sampled. A set of computer-generated random numbers were then used to select a first sample of students, with each participating school represented by approximately 24 students. Added to this original sample of students was a supplementary sample of Hispanic and Asian/Pacific Islander students, including their parents and teachers, increasing the number of students per school to 26 on average.

Base-Year Survey

Four components constituted the base-year study design. The first component consisted of student questionnaires designed to gather information pertaining to basic background, as well as their attitudes about school, grades, self-esteem, future expectations, and social relationships. Students were also administered cognitive tests in reading, mathematics, science, and social studies.

The second component consisted of parent questionnaires. One parent of each student was asked to fill out a questionnaire pertaining to educational expectations for their child, the amount of support they give to their child, and other family characteristics relevant to achievement, such as size of family, income, and so forth.

The third component consisted of selecting two teachers for each student from among four core subject areas (i.e., mathematics, reading, science, and history) to complete a questionnaire designed to collect information about classroom practices, as well as school and teacher characteristics.

The fourth component consisted of a school administrator questionnaire that was completed by the designated school administrator. The purpose of the administrator questionnaire was to gather descriptive information about the teaching staff, school climate, student body characteristics, and school policies.

NELS:88 Follow-ups

First Follow-up Core Study and Sample Design

The first follow-up of NELS:88 comprised the same components as the base-year study, with the exception of the parent survey, which was not repeated in the 1990 round. In addition, three new components—the dropout study, base-year ineligible study, and school effectiveness study—were initiated in the first follow-up, and a freshened sample was added to the student component. As in the base year, students were asked to complete a questionnaire and cognitive test. The cognitive test was desinged to measure tenth-grade achievement and cognitive growth between 1988 and 1990 in the subject areas of mathematics, science, reading, and social studies (history/geography/civics). The student questionnaire collected basic background information, and asked stdents about such topics as their school and home environments, participation in classes and extracurricular activities, current jobs, their goals and aspirations, and opinions about themselves. Following the base-year design, two teachers of each student were asked to complete a teacher questionnaire, and a school administrator questionnaire was completed by school principals. First-time participants in NELS:88—including students just added to the cohort through the sample freshening process, base-year ineligibles who became eligible in the first follow-up, and base-year nonrespondents who did participate in the first follow-up—completed a new student supplement, containing basic demographic items which were asked in the base year but not repeated in the first follow-up. The first follow-up also surveyed and tested youths who had dropped out of school at some point between the spring term of the 1987-88 school year and that of the 1989-90 school year. The dropout questionnaire collected information on a wide range of subjects, including reasons for leaving school, school experiences, absenteeism, family formation, plans for the future, employment, attitudes and self-concept, and home environment.

The selection of students was implemented in two stages. The first stage of sampling involved the selection of 21,474 students who were in the eighth-grade NELS:88 sample in 1988. This includes students who were base-year nonrespondents, as well as approximately 2,400 U.S. Department of Education Office of Bilingual Education and Minority Languages Affairs (OBEMLA) sponsored sample members. Because some sophomores in 1990 were not in the country or were not in the eighth grade in the spring term of 1988, the representative subsample of the eighth-grade cohort was augmented through a process called freshening. The goal was to provide a representative sample of students enrolled in the tenth grade in the 1989-90 school year. Freshening added an additional 1,229 10th-graders (of whom 1,043 were found to be eligible and still retained after final subsampling) who were not contained in the base-year sampling frame.

Several components were added to the first follow-up to increase its analytic power. One of these enhancements, the base-year ineligible (BYI) study, was added to the first follow-up in order to ascertain the 1990 school enrollment status and the 1990 NELS:88 eligibility status of students who were excluded from the base-year survey due to a language barrier or physical or mental disability which precluded them from completing a questionnaire and cognitive test. Any eligible students were included in both the first and second follow-ups.

In addition to the BYI study, the school effectiveness study (SES) was added to the first follow-up to provide a probability sample of tenth-grade schools, with a sizable and

representative within-school sample of students, through which longitudinal school-level analysis (comparable to 1980-82 HS&B sophomore cohort analysis) could be conducted. In the first follow-up SES, permission to conduct the study was gained from 251 schools; 248 of those schools were final SES participants. The within-school student sample of 248 participating first follow-up high schools in the 30 largest metropolitan statistical areas was augmented to increase the number of students per school to a value appropriate for school-effects analyses.

Second Follow-up Core Study and Sample Design

The NELS:88 second follow-up repeats all components of the first follow-up study. In addition, the parent component is included once again in the second follow-up. Two new components—the transcript and course offerings components—were initiated in the second follow-up. The course offerings component was undertaken for sample members as described in section 1.3.5. Sample freshening was also carried out during the spring term of the 1991-1992 school year.

As in the previous waves, students were asked to complete a questionnaire and cognitive test. The cognitive test was designed to measure twelfth-grade achievement and cognitive growth between 1988 and 1992 in the subject areas of mathematics, science, reading, and social studies (history/citizenship/geography). The student questionnaire asked students about such topics as academic achievement, student perceptions and feelings about their curriculum and school, family structure and environment, social relations, aspirations, attitudes, and values, especially as they relate to high school and occupational or postsecondary educational plans. The student questionnaire contained a supplement for early graduates, the intent of which was to document the reasons for and circumstances of early graduation.

In a departure from the base-year and first follow-up teacher survey designs, only one teacher (either a mathematics or science teacher) of each student was asked to complete a teacher questionnaire. If a student was not enrolled in either a mathematics or science class, no teacher questionnaire was administered. During the spring term of 1992, 10,961 students, 69.2 percent of the students in the contextual components sample, were enrolled in a mathematics class, a science class, or both. A school administrator questionnaire, as in the first follow-up, was completed by the school principal. If a student was a first-time participant in NELS:88, he or she also completed a new student supplement, containing basic demographic items which were asked in the base year but not repeated in the second follow-up.

The second follow-up, in addition to surveying students who were enrolled in school, surveyed and tested youths who had dropped out of school at some point between the spring term of the 1987-88 school year and the spring term of the 1991-92 school year. The dropout questionnaire collected information on a wide range of subjects, including reasons for leaving school, school experiences, absenteeism, plans for the future, employment, attitudes and self-concept, and environment.

Each student and dropout selected for the first follow-up was included in the second follow-up. From within the schools attended by the sample members, 1,500 twelfth-grade schools were selected as sampled schools. Of the 1,500 sampled schools, the full complement of component activities occurred in 1,374 schools. For students attending schools other than those 1,374

schools, only the student and parent questionnaires were administered. Retaining the entire first follow-up sample in the 1992 round provides a maximally efficient sample for the NELS:88 second follow-up while satisfying researchers who are interested in maximizing the presence in the study of rare policy-relevant populations.

The student sample was then augmented through freshening at the NELS:88 selected schools, the aim of which was to provide a representative sample of students enrolled in the 12th grade during the spring term of the 1991-92 school year. Freshening added an additional 364 12th-graders (of whom 243 were deemed eligible) who were not contained in either the base-year or first follow-up sampling frames. Of the 364 freshened students, 76 were sampling errors and became ineligible through questionnaire data; 15 dropped out of school between the sampling effort and data collection (these 15 are found only on the restricted use file); 13 were out of scope due to language barrier, moved out of the country, or were deceased; 9 were ineligible due to mental or physical incapacity; and the status could not be collected for 8 cases. Additional information about the second follow-up sample design is provided in the forthcoming NELS:88 *Second Follow-Up Sample Design Report*. Most in-school survey sessions were held in the period from January through March 1992, though a few took place as late as June 1992. Dropout data collection occurred between January and October 1992.

Two new components, the **transcript** and the **course offerings** components, were added to the NELS:88 second follow-up. These components provide archival data which describe the academic experience of high school students and the curricula offered by their schools. The complete high school transcript record was collected for (1) the contextual sample—students attending sampled schools in the spring of 1992; (2) all dropouts, dropouts in alternative programs, and early graduates, regardless of school affiliation; and (3) triple ineligibles enrolled in the twelfth grade in the spring of 1992, regardless of school affiliation. Triple ineligibles are 1988 8th-graders who were ineligible for the base-year, first follow-up, and second follow-up surveys due to mental or physical disability or language barrier. NELS:88 course-taking data will provide not only a baseline against which future student outcome measures can be compared, but will illuminate trends when contrasted to the 1982 HS&B high school transcript study, the 1987 National Assessment of Educational Progress (NAEP) transcript study, and the 1990 NAEP transcript study. The course-offerings component provides curriculum data from second follow-up school effectiveness study schools through which school effects on student outcomes can be studied.

The second follow-up school effectiveness study returned to 247 of the 251 cooperating first follow-up SES schools, conducting freshening on both longitudinal and SES sample members, and selecting additional students from the pool, including students who transferred into the school since the 1989 selection of SES students. The second follow-up school effectiveness study was enhanced by the addition of archival data collected by the new course-offerings component and was further augmented by the administration of free response science and mathematics cognitive test items in SES schools.

The *third follow-up* (1994) provides information about employment and postsecondary education. A *fourth follow-up* is planned for 2000.

Sample Weights

The general purpose of the NELS:88 weighting scheme is to compensate for unequal probabilities and to adjust for the effects of nonresponse. Weights are often calculated in two main steps. In the first step, unadjusted weights are calculated as the inverse of the probabilities of selection, taking into account all stages of the sample selection process. In the second step, these initial weights are adjusted to compensate for nonresponse; such nonresponse adjustments are typically carried out separately within multiple weighting cells. This is the process that was applied to weighting NELS:88 data in all rounds.

For the base-year survey, two different weights (BYQWT and BYADMWT) were calculated to adjust for the fact that not all sample members had data for all instruments. Two weights were also developed for the overall NELS:88 first follow-up sample. The first, or *cross-sectional*, weight (F1QWT) applies to all members of the first follow-up sample who completed a first follow-up questionnaire, regardless of their participation status in the base year. The second, or *panel*, weight (F1PNLWT) applies to all members of the first follow-up sample with complete data from both base-year and first follow-up rounds of the study. For the second follow-up, eight weights were developed for inclusion on the data files, including (1) a cross-sectional weight (F2QWT) that applies to all members of the second follow-up sample who completed a second follow-up questionnaire, regardless of their participation status in previous rounds; and (2) a panel weight (F2PNLWT) that applies to sample members who completed a questionnaire in all three rounds of NELS:88.

For this report, the majority of the analyses include only those students who were present in all three NELS:88 surveys (i.e., base year, first follow-up, and second follow-up). The second follow-up panel weight (F2PNLWT) was used in most of the analyses described in chapters 3 through 5. Similarly, the eighth-grade to twelfth-grade transcript panel weight (F2TRP1WT) was used in chapters 4 and 5 when the variables of interest were drawn from student transcripts (e.g., total units earned in core subjects). This cohort analysis ensures that the differences observed between disabled students as identified by parents versus those identified by teachers are not due to sampling fluctuations across the three surveys. In chapter 2, where description is provided of unweighted sample sizes and weighted percentages for each defined disability category, various cross-sectional weights as well as panel weights were used. In chapter 2, as well as in chapter 4, analyses involving the BYI sample were carried out using unweighted data.

Variables Used in This Report

Disability Definitions:

Parent Definition of Disability Status:

BYP47—Student(s) has one or more of the following problems—visual handicap (not correctable by glasses), hearing problem, deafness, speech problem, orthopedic problem, other physical disability, specific learning problem, emotional problem, mental retardation, other health problem

BYP48—Student(s) has ever received services for one or more of the following problems—visual handicap (not correctable by glasses), hearing problem, deafness, speech problem, orthopedic problem, other physical disability, specific learning problem, emotional problem, mental retardation, other health problem

Teacher Definition of Disability Status:

F1T1_8—Student has ever fallen behind in school work because of health problems

F1T1_9—Student has a learning disability that affects his/her school work
F1T1_10—Student has a physical or emotional handicap that affects his/her school work

Student Definition:

F1S34f—Ever been in a program for educationally handicapped
F1S34g—Ever been in a program for physically handicapped

Chapter 3:

F2SEX—Sex
F2RACE1—Race, coded as Asian/Pacific Islander; Hispanic; black, not Hispanic; white, not Hispanic; and American Indian, Alaskan native. In this report, F2RACE1 is recoded both to compare minority to nonminority students and to distinguish white, black, and other students
F2BIRTHY—Birth year. In this report, F2BIRTHY was subtracted from 1988 to estimate the student's age at the time of the base-year survey
BYSESQ—Quartile coding of variable BYSES. BYSES is the socioeconomic status composite developed based on responses to the base-year parent survey
BYPARED—Parents' highest education level
FAMCOMP—1988 adult composition of the household (first follow-up variable constructed using base-year parent survey data). In this report, FAMCOMP used to identify students living in female-headed households
BYLOCUS1—Locus of control 1 (base year)
F1LOCUS1—Locus of control 1 (first follow-up)
F2LOCUS1—Teen locus of control, version 1 (second follow-up)
BYCNCPT1—Self-concept 1 (base year)
F1CNCPT1—Self-concept 1 (first follow-up)
F2CNCPT1—Teen self-concept, version 1 (second follow-up)
G8URBAN—Urbanicity composite of school site
G8LUNCH—Percent free lunch in school

Chapter 4:

BYP44—8th-grader ever held back a grade
F2S13A—Ever been in remedial English class
F2S13B—Ever been in remedial math class
F2S13H—Ever been in dropout prevention program
F2S13F—Ever been in educationally handicapped program
F2S13G—Ever been in physically handicapped program
F2RSPFLG—Specialized courses or programs. In this report, "special education" and "special education and bilingual education" codes were used to designate student participation in special education
F2RHEN_C—Units in English (HS&B)
F2RHMA_C—Units in mathematics (HS&B)
F2RHSC_C—Units in science (HS&B)
BYP59B—Attend parent-teacher organization meeting
BYP59C—Take part in parent-teacher organization activities
F2S30AA-F2S30AC—Participated on a team sport at school, an individual sport at school, in cheerleading/pompom/drill team at school. In this report, the sum of

positive responses to each of these three items, coded as 1, is used to estimate the number of sports in which the student participates at school

F2S30BA-F2S30BI—Participated in school music group, school play or musical, school government, academic honor society, school yearbook or newspaper, school service clubs, school academic clubs, school hobby clubs, school FTA, FHA, FFA. In this report, the sum of positive responses to each of these nine items, coded as 1, is used to estimate the number of school activities in which the student participates

Chapter 5:

F2RHENG2—Average grade in English (HS&B)

F2RHMAG2—Average grade in mathematics (HS&B)

F2RHSCG2—Average grade in science (HS&B)

F22XRPRO—Overall reading proficiency

F22XMPRO—Overall math proficiency

BY2XRIRR and F22XRIRR— Reading IRT-estimated number right for base year (rescaled for comparability to the second follow-up) and second follow-up. In this report, the difference in these measures is used to estimate gains in reading performance

BY2XMIRR and F22XMIRR— Mathematics IRT-estimated number right for base year (rescaled for comparability to the second follow-up) and second follow-up. In this report, the difference in these measures is used to estimate gains in mathematics performance

F2S42A and F2S42B—How far in school father or mother wants R to go. In this report, the higher value of either F2S42A or F2S42B was used as the indicator of parents' highest educational expectation for student(s)

F2S44B—Has R taken the College Board SAT test. In this report, students responding either "Yes, I've already taken it" or "Yes, I plan to take it this year" are coded as having taken the SAT

F2S44C—Has R taken the ACT test. In this report, students responding either "Yes, I've already taken it" or "Yes, I plan to take it this year" are coded as having taken the ACT

F2EVDOST—Ever dropped out status. Indicates whether or not the sample member has ever dropped out in the first follow-up or second follow-up. F2EVDOST is based on a sample member's dropout history since the beginning of the first follow-up in March 1989

Computation of Statistical Tests for This Report

For continuous education outcomes and differences in proportions, t-tests were derived by dummy variable regression in which the outcome of interest was regressed on group membership [e.g. GPA = a + (b)membership, where membership = 1 if identified as disabled by parent, 0 if not identified]; the t-test evaluates the slope coefficient of group membership, which can also be interpreted as the mean difference between the groups. For categorical variables, such as SES, chi-square tests were carried out. All analyses were performed using SUDAAN regress or chi-square procedures.

A comparison in this report is statistically significant if the difference between statistics for two groups is greater than 1.96 times the standard error of the difference, approximated as the

square root of the sum of squares of the standard errors of the statistics for each of the groups. That is, the large scale approximation to Student's t statistic is used, with a two-tailed alpha level of .05. When multiple statistical tests of significance are made, the Bonferroni correction is applied to adjust for the increased likelihood of finding some difference significant. This correction involves definition of a "family" of comparisons and division of the alpha level (for reporting significance) by the number of comparisons in that family. A family is defined here as comparisons involving a single column of a table in the report; typically, eight (8) when comparing specific parent-identified disability categories to the not identified group and five (5) when comparing specific teacher-identified disability categories to the not identified group.

There were three different types of comparisons:

Type 1: When the "difference" of interest was between disabled versus nondisabled students at the most general level (e.g., for outcomes comparing students identified as disabled by parents to students not so identified)—the dummy variable regression or cross-tabulation procedure (described above) was used (i.e., no special treatment was required in constructing the comparison groups).

Type 2: When the "difference" of interest involved comparison of students with a specific disability (e.g., students with learning disabilities as identified by parents) to those not identified as disabled, the following were compared: (a) all individuals who had the specific disability with (b) all individuals who had not been identified with any disability using regression or cross-tabulations. The inclusion of individuals with other disabilities in addition to the focal disability in the focal group for the comparison is in line with the decision to specify overlapping disability groups (i.e., to include individuals in both specific disability and multiple disability categories as indicated by their reported disability conditions) and is appropriate for addressing issues concerned with specific disabilities because it ensures all individuals with the disability are included in the analysis.

Type 3: When the "difference" involved comparing students identified as disabled by parents to students identified as disabled by different sources (e.g., parents or teachers)—the overlapping students (i.e., those students identified by both sources as disabled) were removed, and the t-test was computed on the remaining groups. This reduces the data used for the significance test substantially, resulting in reduced degrees of freedom for the t-tests and a loss of precision in the standard error estimates. However, the overlapping students in this case do not contribute to the observed differences, and since the groups are not mutually exclusive, the degrees of freedom based on the total *n* or total number of comparisons is inappropriate in any case. Moreover, using the entire group to add precision to the standard error estimates can be questioned because the measures may not be homoscedastic across the "overlap" and "nonoverlap" groups.

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